REVIEW.

ARTICLE X.—*Statistical Report on the Sickness, Mortality, and Invaliding among the Troops in the West Indies. Prepared from the Records of the Army Medical Department and War-office Returns. Presented to both Houses of Parliament, by command of her Majesty.* London: 1838.

Statistical Reports on the Sickness, Mortality, and Invaliding among the Troops in the United Kingdom, the Mediterranean, and British America. Prepared from the Records of the Army Medical Department and War-office Returns. London: 1839.

IN 1816, Sir James M'Grigor, director-general of the medical department of the British army, established a system of returns and reports, which has given birth to documents extending over 160 folio volumes, containing an historical record of the medical transactions of the army. The duty of arranging these materials, and of condensing the statistical results, was entrusted to captain (now major) Alexander M. Tulloch, who was assisted in the preparation of the medical details by Henry Marshall, Esq., deputy inspector-general of hospitals, and by staff assistant-surgeon Balfour. The task was a difficult and laborious one—a labour which has been amply repaid by the interesting and valuable character of the results. The volumes before us are the first fruits of this enterprizing spirit, of which, as they form condensed documentary reports, replete with numerical details, it is no easy matter to furnish an analysis. The later reports "on the sickness, mortality, and invaliding among the troops in Western Africa, St. Helena, the Cape of Good Hope, and the Mauritius," will not now engage our attention.

Much has been said of late of the value of statistics—the numerical method as applied to the sciences. "Statistics," says Professor Guy, "considered as a speculative science, will scarcely suffer by comparison with the most perfect of the mixed mathematical sciences." It is a subject of deep importance to the physiologist and the philanthropist. Numerical analysis applied to governmental objects, soon bestowed the character of a science upon political economy; and its application to the investigation of morbid actions has already proved so successful, that the doctrine of averages has been not unaptly styled the mathematics of medical science. As the experience of the civil practitioner is on too limited a scale, and his observations too immethodical to warrant general conclusions, it is only by extending such observations through a series of years, and over vast masses of individuals, that correct conclusions can be attained, as well as important relations disclosed discoverable in no other way. As a test of the truth of theories, statistical investigations are of vast importance. Could all medical opinions be submitted to the searching ordeal of numbers, the substance of many a ponderous folio might be condensed upon its title-page!

At the same time it must be borne in mind, that figures are not facts—a remark that will find illustration when we come to investigate these statistics in reference to pulmonary diseases. Hence the necessity of ascertaining the correctness of the data represented by numericals. Arithmetical reasoning is of all kinds the most fallacious, for not unfrequently the error in the premises can be detected only by the absurdity of the results. "It is the easiest thing possible," says M'Culloch, "to pile figures on figures, but unless deduced from correct data, they serve only to mislead; and they do this the more easily, that they have a scientific air about them, and that most people shrink from the irksome task of examining whether tabular statements be correct or not. There is nothing in fact of which one should be so skeptical as the greater number of statistical facts and details, or with respect to which a sound and searching criticism is so necessary."

As the troops employed in garrisoning the British possessions in the West Indies form several military commands, the statistical details are investigated in the following order:—

I. *The Windward and Leeward Command.*
II. *The Jamaica Command.*
III. *The Bahamas,* and
IV. *The Honduras Command.*

The *Windward and Leeward Command* embraces various islands and possessions extending from 6° to 17° of north latitude, and from 56° to 63° of west longitude. It includes that portion of the American continent termed British Guiana, with the islands of Trinidad, Tobago, Grenada, St. Vincent's, Barbadoes, St. Lucia, Dominica, Antigua with Montserrat, and St. Kitts with Nevis and Tortola. These islands differ so materially in physical aspect, that any general description would not be sufficiently comprehensive to be applicable to the whole. Thus Antigua and Barbadoes, on the one hand, are comparatively low, barren, and rocky, with a dry climate and equable temperature; and, on the other hand, St. Lucia, Trinidad, Tobago, and Dominica, are mountainous, covered with dense forests, and intersected with deep ravines, in which the rains stagnate among a mass of decaying vegetation, thus creating a damp climate and variable temperature. To the other islands an intermediate character pertains; whilst the coast of British Guiana consists of an immense tract of level country, elevated only a few feet above the level of the sea, and presenting, during the rainy season, an almost endless succession of swamps and marshes. The leading characteristics which distinguish the climate of these regions from that of temperate latitudes are the following:—

"1. The first peculiarity which distinguishes the climate of this command is a high temperature, a necessary consequence of proximity to the equator. The mean height of the thermometer throughout the year, is, however, rather under than above the average of similar latitudes, being only about 80⅓°. In none of the islands is it above 82°, or under 79°, and any slight difference in this respect results more from their geological features, or extent of cultivation, than the mere difference of latitude; as the mean temperature of British Guiana in latitude 6°, is but 80½°, while that of St. Kitts more than 12° further to the north, is 81°.

"2. The next peculiarity which extends to this, as well as most tropical regions, particularly of insular situation, is great uniformity of temperature. The difference between the highest and the lowest mean range of the thermometer, is, even in the most variable of the islands, only 13°, and in some it is not more than 4° throughout the year; whereas in Britain, it is, in most years, upwards of 30°.

"3. In this, as well as other tropical climates, there is but little change in the elasticity or pressure of the atmosphere. The extreme range of the barometer is not more than from a quarter to half an inch throughout the year, and it is not materially affected even by hurricanes; whereas, in this country its range is from 2 to 3 inches, and it varies with every slight change of weather.

"4. One of the most marked of the atmospherical peculiarities of these regions, is the large quantity of rain which falls annually, being, on the average, at least three times as much as in Britain—a necessary consequence of rapid evaporation under a tropical sun. The quantity, however, varies materially in the different colonies, according as their surface is mountainous or level, clothed in wood, or cleared and under cultivation. We have, in a subsequent portion of this report, stated the fall of rain in each colony, so far as it has been ascertained by measurement; the average quantity throughout the whole command has been estimated at from 60 to 70 inches annually.

"The rain of these regions is, however, of a very different character from that of Britain, being confined principally to two seasons of the year, termed the spring and autumnal rains, and then falling, not in gentle showers, but in torrents, which, unless in a very dry soil, or where there is free drainage, speedily inundate the surrounding country.

"5. The four seasons of temperate climates, are therefore represented by two wet and two dry seasons; but as the rains follow the course of the sun, it is obvious that the period of their commencement and duration must vary according to the proximity of the settlements to the equator. In Guiana, the most southerly, the spring rains generally extend from December to January, the autumnal from May to August, while in the most northerly of these settlements the former does not commence till April or May, and the latter extends from October to December.

"In many of the islands, particularly the less hilly ones, there is scarcely any deposition of dew, and in the others it is generally scanty, except in densely wooded districts.

"6. In regions exposed to such a high temperature, it is fortunate that the heat of the day is generally modified by a sea breeze, not of that variable character which prevails in temperate climates, but which blows with nearly uniform force, and from one direction, during nine months of the year. It is termed the trade wind, and generally comes from the east and its collateral points, except from August to December, when it veers round, and blows slightly from the south and west, with frequent calms at intervals.

"While this trade wind prevails during the day, a land wind, in all the large and mountainous islands, blows with almost equal regularity at night; for as soon as the sea breeze dies away, the hot and rarified air of the plains, ascending to the mountain tops, is there condensed by the cold, and flows in a steady current towards the ocean, to supply the equilibrium of the atmosphere. In the smaller islands, and those in which there are no mountains, there is either no land wind, or it is very slight. The sea breeze generally sets in between 10 and 11 A. M.; blows with increasing force till 3 P. M., and dies away about sunset, when, after a short interval, the land wind commences, and continues till sunrise.

"In these and some other tropical regions in similar latitudes, hurricanes are occasionally experienced between the month of August and latter end of October; hence denominated the hurricane season. Trinidad, Tobago, and the settlements to the south, have hitherto been exempt from them, but they sometimes fall with dreadful violence on the other islands. Barbadoes, in particular, has suffered very severely from their ravages.

"During the rains, particularly at their commencement and termination, thunder and lightning are very common, but seldom occur at any other period of the year. Unfortunately little has been done to investigate the electrical condition of the atmosphere in these parts of the world, and therefore we can only estimate the presence of that agency from its visible effects at these periods." p. 4.

The annual mortality among the white troops in this command, during the last twenty years, is 93½ per 1000 of the strength; or, in other words, about an eleventh part of the force died annually. This ratio of mortality, however, is considerably lower than that of the previous fourteen years, terminating with 1816. It was then 138 per 1000. As the mortality among the same class of troops in the United Kingdom, during a long series of years, is only about 15 per 1000, the comparative insalubrity of this climate is shown. It further appears that among every 1000 white troops, there have been annually admitted into hospital 1903, so that, on an average, every man must have been under medical treatment about once in every six months and a half. This proportion is just twice as high as in the United Kingdom. But the difference in the ratio of severity among the cases treated is still greater; for in the West Indies, there is one death in every 24 admissions, whilst on the home station there is only one in every 67 cases.

In the Windward and Leeward command, the class of febrile diseases comprises more than a third of all the admissions, and about a half of all the deaths; and compared with the same diseases among troops in the United Kingdom, the ratio of admissions is ten times, and that of deaths twenty-five times higher. About two-fifths of the fever admissions are intermittents, which seldom prove fatal. In the low marshy settlements of Demerara and Berbice, the annual number of cases is frequently equal to the whole force employed! In other stations, however, they are comparatively rare, and in some almost unknown.

Eruptive fevers are so exceedingly rare in this command that, in the period of 20 years, only 13 have been attacked, and but one died among all the white troops.

The mortality from diseases of the lungs is high. As the Reporter, from his statistical results, arrives at the conclusion that it is "*by no means likely that any beneficial influence can be exerted by climate itself*" in pulmonary affections, this subject will, in the sequel, engage special consideration. In the progress of our review, we will, therefore, make such quotations as will fairly express the views of the Reporter, reserving our remarks to the conclusion. Thus—

> "Though the proportion of admissions by this class of diseases is lower than among troops in the United Kingdom, in the proportion of 115 to 148, the ratio of mortality is much higher, as nearly 10½ per thousand of the strength have been cut off annually; whereas in Britain the deaths from the same class of diseases do not average, at the utmost, more than 8½ per 1000. This arises from the greater prevalence of consumption; for, out of an aggregate strength of 86,661, serving in the Windward and Leeward Command, not fewer than 1023 were attacked by that fatal disease, being 12 per 1000 annually, while out of an aggregate strength of 44,611 dragoon guards and dragoons serving in Great Britain, only 286 were attacked, being about 6½ per 1000. Not only is consumption productive of great mortality in this command, but inflammation of the lungs, and chronic catarrh are nearly twice as prevalent and twice as fatal as among troops in Britain, thus showing how little effect a mere increase of temperature has in modifying these diseases."

We would premise here that the Reporter's conclusions, which show "a striking contradiction to the popular idea" in reference to pulmonary diseases, are founded in error. We will show that not only are the inferences deduced from his numerical results, in many instances, unwarranted; but that a radical error pervades the mode of investigation adopted. We agree with the author that pulmonic lesions, as regards the *annual* ratio, are more prevalent in certain *systems* of climate in southern than in northern latitudes; but when we come to investigate the question in relation to the relative influence of the *seasons*, the general opinions in regard to change of climate in pulmonary affections, maintained since the days of Hippocrates, will be triumphantly established.

Hepatic affections, although by no means so prevalent as in the East Indies, yet are nearly thrice as rife as among the troops in the United Kingdom, and five times more fatal. The general impression is that this class of diseases has an intimate connection with tropical temperature; but, on comparing the average of all the West India commands with the ratios given by England, Canada, the Mediterranean stations, and the United States, it is not found, on making some allowance for the circumstance that the white troops in the West Indies are from northern climes, that this class of diseases is much influenced by temperature.

The class of *Gastric and Intestinal affections*, among the white troops, is a most fertile source of sickness and mortality. The proportion attacked annually is 421 per 1000, whilst in England it is only 95; and in the former, the mortality is 21 per 1000—a ratio forty times as high as among troops at home. The principal source of this mortality is chronic dysentery, one-fifth of the cases proving fatal. Gastritis and enteritis also prove extremely severe in their character, and fatal in their effects.

The *Diseases of the Brain*, under which class are included inflammation, cephalalgia, coup de soleil, hydrocephalus, apoplexy, paralysis, epilepsy, fatuity, mania, and delirium tremens, appear at first sight to be very prevalent and fatal, the ratio of admissions and deaths being four times as high as in Great Britain; but as more than half of these cerebral affections have resulted from *delirium tremens*, it seems that this class of diseases is not very much influenced by high temperature. These results are confirmed by the statistics of the United States' Army, which show that the vice of inebriation may be indulged in our northern states, as contrasted with the southern, with comparative impunity.

Dropsies.—The ratio of admissions and deaths by this class of diseases, which are mostly the sequences of fevers, is very high. Compared with England, it is nearly as eight to one.

In the other classes of diseases, little worthy of remark is presented. A fact deserving of notice is the rarity of admissions under the head of venereal diseases; and this is particularly striking, from the circumstance, that, although the ratio of ulcers on all other parts of the body is nearly thrice as high as in Britain, the average of those on the genitals is eight times lower. As there are no police regulations on this subject in the command, and, as the ratio of venereal cases in the East Indies and the Mauritius is greater even than in England, it follows that this exemption arises from some peculiarity of the climate unfavourable to the existence and propagation of the disease.

Having noticed the more important facts in regard to the white troops in the windward and leeward command, we shall now take a glance at the results furnished by the black troops and pioneers. As we possess no exact statistical records of the mortality of the negroes in their native country, it is difficult to determine the influence of other climates on their constitutions. So far as statistical inquiries have extended, it seems that in no country does the mortality among the indigenous civil inhabitants, between the ages of 20 and 40, exceed 15 per 1000 annually. Among the corps of the Cape of Good Hope, composed of the aboriginal inhabitants of Southern Africa, it is only 11 per 1000; among the Bengal native troops it is the same; and among those of Madras it does not exceed 13 per 1000. In the West Indies, the mortality of the black troops, who "are for the most part natives of the interior of Africa," is 40 per 1000. The same liability to a high ratio of mortality seems to affect the blacks wherever they may be employed, as in the Mauritius, Ceylon, Gibraltar, and even at Sierra Leone on the sea-coast of their own continent. In Ceylon, they soon become extinct! The constitution of the negro would seem, therefore, to be little fitted to assimilate itself to foreign climates.

The class of febrile diseases which prove, in this command, the fertile source of inefficiency and mortality among the white troops, exerts comparatively little influence upon the blacks. Whilst the annual ratio of mortality per 1000 of the mean strength from this cause is 37 among the whites, it is less than 5 among the blacks. On the other hand, eruptive fevers, especially small-pox, are very fatal to the latter.

Diseases of the lungs are not so prevalent as among the whites; but, owing to the more fatal character of consumption and inflammation of the lungs, are productive of greater mortality. The fatal influence of these affections is apparent in every climate in which they have been employed. In this command, upwards of two-fifths of all the deaths among the negro troops have arisen from this class of diseases.

This class of troops suffer but little from hepatic affections. Gastric and intestinal affections, too, are only about one-third as fatal as among the whites, and about one-fifth as prevalent, but they induce upwards of a sixth of the whole mortality.

In the narrow limits to which our remarks are confined, we can merely direct attention to the more prominent facts. Much less then are we enabled to follow up the details comprising the divisions of this command.

British Guiana is a vast flat, consisting of a deep alluvial soil. The climate is distinguished for its extreme moisture, 157 inches of rain having fallen in a single year. Among the white troops the annual mortality is 84, and among the blacks 41 per 1000. *Trinidad*, in its physical aspects, presents a striking contrast to the low lands of Guiana. Its mountains rise 3000 feet above the sea, broken into the most abrupt forms, and clothed to their summits with majestic forests. Among the white troops the ratio of annual mortality is 106, and among the blacks 40 per 1000. *Tobago* is also of a mountainous character. The average mortality among the white troops is 153, and among the black 34 per 1000 *annually!* Amongst the causes of mortality, fevers stand first; next, gastro-intestinal affections; and, thirdly, pulmonic affections. *Grenada* is a small island with mountains 3000 feet. The mortality among the white troops is 62, and among the black 28. *St. Vincent* is another small island, with a central mountain 4000 feet in height. Among the black troops, the ratio of mortality is 36, and among the white 55. *Barbadoes*, which exhibits little of that exuberant vegetation which characterizes the other islands of this command, rises by a succession of terraces to the height only of 1100 feet. The mortality among the white troops is 58, and among the black

46 per 1000. In *St. Lucia* the ratio of mortality among the troops is as follows:—whites 122 *per mille per annum!* blacks 42 ditto! *Dominica,* which is apparently of volcanic origin, has a bold range of rugged mountains rising to the height of more than 5000 feet intersected by deep ravines. The mortality of the whites is 137, and that of the blacks 40! In *Antigua* and *Monserral* the ratio of the former is 41, and the latter 29. All these calculations are made on an average of 20 years. The malignant influence exercised by these islands, on European constitutions, is manifested in different forms. Thus Tobago is most remarkable for fevers; Barbadoes for affections of the lungs; Dominica for those of the brain and the bowels; Grenada is most noted for diseases of the liver; and Trinidad for dropsical affections.

The Jamaica Command constitutes the second division of this report. This island is 170 miles in length, by 50 in breadth. A range of mountains from 7000 to 8000 feet in height runs throughout its whole length, forming a complete barrier between the north and the south sides of the island. On approaching from the south, the immense mass of the Blue Mountains bursts at once upon the view—their summits a succession of abrupt precipices—their lower range crowned with wood and sloping down to a plain, from eight to twelve miles in breadth, along the coast, on which the principal towns and largest military stations are situated. On the north side, as the ground rises at once from the sea by a succession of acclivities, separated by wide valleys, there are few plains or level surfaces of any extent. The lower hills, which are conical, are studded with thick groves of the pimento tree; but these features gradually become bolder in their outline until they join the high range in the centre of the island, which are covered with immense forests of cedar. The interior of the island presents the features peculiar to a highland district, in some parts rugged and densely wooded, in others spreading out into a wide expanse of table land or elevated plain.

"As these portions of the island present varieties in physical aspect, so they exhibit a corresponding diversity in climate. On the plains or sea-coast of the south side, the thermometer at noon does not vary more than 8° or 9° throughout the year; its greatest height being about 92°, and its lowest 83°. The midday heat on both sides of the island is greatly modified by the influence of the sea-breeze, which generally sets in from the eastward about 8 or 10 o'clock in the morning, increases in force till about 2, and declines with the sun, till, on the approach of evening, it is succeeded by the land wind from the mountains. When these winds become less regular, or altogether fail, as is sometimes the case before the rainy season, the atmosphere is exceedingly oppressive to the feelings, though the thermometer perhaps exhibits but little change in the temperature.

"The quantity of rain which falls throughout the year is about 50 inches, and the seasons may be distinguished as follows. From the middle of December to the middle of April, there is generally clear dry weather, except a few showers at Christmas. During the first three months of this period north winds prevail, with considerable diminution of temperature, the thermometer sometimes sinking so low as 70° in the morning, but by mid-day it generally stands at from 83° to 85°; the sea breezes at this time are weak and irregular. About the middle of April the sea breeze fails altogether, the thermometer rises to about 86° at mid-day, and is seldom below 80° at night; the heat becomes oppressive, the atmosphere cloudy, and a few transient showers begin to usher in the spring rains, which continue with great violence during most part of May, and are generally preceded by heavy storms of thunder and lightning. The weather in June is generally hot and dry, the sky is seldom obscured by a cloud, the thermometer often rises to 92° at noon, the land wind fails, and the nights are consequently oppressive; but the sea breeze is strong, and tends greatly to moderate the intensity of the heat. Very little change is perceptible throughout July or August, but in September there is the same close sultry weather as in April, which continues till the autumnal rains set in, about the middle of October. These are generally preceded by thunder and lightning, though not to so great an extent as in spring, and continue from four to six weeks, during which period the temperature undergoes a reduction of about three or four degrees by day, and six or seven by night.

"From July to October are the hurricane months in this island, but fortunately these phenomena are of rare occurrence.

"The seasons on the north side of the island are somewhat different, the rains being generally a month later in their commencement, and much longer in their duration than on the south side, a greater quantity also falls, and the showers are more equally distributed throughout the year. Owing to the vicinity of the mountains, and there being little extent of level ground, the atmosphere is cooler in winter, and more liable to sudden alternations of temperature." p. 42.

As the elevation of the lands in the interior of the island produces a corresponding modification of temperature, almost every variety of climate is found. At a height of 4200 feet, the range of the thermometer is from 55° to 65°; and in winter, it falls even as low as 44°. Here the vegetation of the tropics gives place to that of temperate regions; and here, while yellow fever cuts off its thousands annually along the coast of the island, a complete immunity from the pestilence exists. It was long since determined by Humboldt that yellow fever is not found above the height of 2500 feet—one of the strongest proofs that the disease is not propagated by contagion, and that it requires a high temperature for its development. In these elevated regions, the inhabitants exhibit that ruddy glow of health which marks the countenance in northern climes, and forms a striking contrast to the pallid and sickly aspect of those that dwell along the coast.

The annual ratio of mortality among the white troops in the Jamaica Command, according to the Medical Returns, is, on an average of 20 years, 121 per 1000; but when we come to include certain omissions, the ratio is as high as 143! As the average mortality during the 13 years preceding 1817, is about the same as since, it seems that the climate has experienced no amelioration. Among the black troops, the mortality is only 30 per 1000.

From *fevers* alone the annual ratio of mortality is among the white troops, 102 *per mille*, whilst among the blacks it is only 8. The fatal bilious remittent fever is much more prevalent in this command than in the Windward and Leeward command. These epidemics spare neither age, sex, nor condition in life. The temperate and the intemperate, the prudent and the thoughtless, fall victims in nearly an equal degree. Their appearance is not confined to any particular season; and all sanatory precautions, save the removal of the troops from the locality, are of no avail in arresting their progress. In regard to *Febris icterodes*, a very arbitrary distinction obtains; for, although hundreds of cases occurred in which patients died of black vomit, yet all, with the exception of 20 cases, are reported under the head of "remittent." The Reporter observes that "unlike the yellow fever of Gibraltar, one attack of the remittent fever of this country secures no immunity from a second." In our own country, at New Orleans for example, one attack of yellow fever is considered a safeguard against a second.

Eruptive fevers are so rare in this command, that among the white troops in the whole course of 20 years, only seven cases are reported.

Diseases of the *Lungs* are about one-third less prevalent, and one-third less fatal than in the Windward and Leeward command. Upon this subject, we shall make another extract, reserving our comments for a fitting time.

> "As an instance how much more prevalent consumption is in that country than in Britain, we may state that of an aggregate strength of 51,567, serving in Jamaica, there have been 661 treated for that disease, being at the rate of 13 per 1000 annually; while out of an aggregate strength of 44,611 dragoon guards and dragoons, serving in the United Kingdom, there have been treated only 286, or between 6 and 7 per 1000 annually, and that, too, though the period over which the latter observations extend, includes two severe epidemics of influenza, which, no doubt, laid the foundation of more cases of this disease than usually occur in this country.
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> "The baneful influence of the climate of the West Indies in accelerating the progress of consumption, has been often remarked by the medical authorities; but it does not seem to have occurred to them, nor indeed had they any means of ascertaining, that at least twice as many cases of it originate in that climate as at home, though those catarrhal affections to which they are generally attributed are there comparatively so rare." p. 47.

The ratio of diseases of the *Liver* is only half as high as in the Windward and Leeward command. Considering the high degree of temperature in this island, it will seem strange that the ratio of admissions, compared with troops in Britain, is only as 10 to 8, and the deaths as one to $\frac{4}{10}$ths.

Under the class of the diseases of the *Stomach* and *Bowels*, the ratio of admissions into hospital is only about one-half, and the deaths scarcely one-fourth as high as in the Windward and Leeward command. As dysentery and diarrhœa, in particular, assume a mild and tractable form, the Reporter is disposed, with good reason, to ascribe much to the circumstance that instead of salt meat, much fresh provisions are supplied.

Diseases of the Brain.—If we exclude from this class the admissions and deaths arising from ebriety, the averages are not much higher than in Great Britain.

Did space permit, it would be interesting to follow the Reporter in the details of his investigation of the relative salubrity of the different military stations of this island, the general results of which have just been brought under notice. Whilst the annual mortality of the post of Maroon Town, situated in the interior of the island, and elevated more than 2000 feet above the level of the sea, is only 33 per 1000, at Montego Bay, on the coast, the ratio is as high as 179, and at Savannah la Mar, it is even 200. As many of the deaths at Maroon Town originated from disease contracted at other stations, the actual mortality does not exceed that of the Foot Guards in London. Whilst some of these mountain stations are very salubrious, yellow fever being there unknown, at Montego Bay it sometimes became necessary to withdraw the troops in consequence of there being none left fit for duty. At Up-park Camp, in 1819 and 1822 nearly a half, in 1825 a third, and in 1827 about a fourth of the garrison were swept off. At Spanish Town, "on no less than seven different occasions, between a fourth and a fifth part of the whole force was cut off in the course of the year, and in 1825, the ratio of mortality amounted even to two-fifths of the strength." At this post, the annual mortality from fevers alone, on an average of 20 years, is 141 per 1000 men.

Bahamas.—This command consists of several hundred islands of various magnitude, extending nearly 600 miles. The most important of the group is New Providence, at which island the troops are principally quartered. The number of white troops is so limited that the Reporter does not make the usual deductions. Among the white troops the annual mortality is 200 per 1000, and among the black it is only 41. Among the former, four-fifths of the deaths arose from fevers, mostly of the remittent type. From this disease, one in 5 of all the white troops attacked died, whilst of the blacks there died only one in 50.

Honduras.—This settlement lies on the southern portion of the North American continent. The annual mortality of the white troops, very few of which were stationed here, is 103 *per mille*, and that of the blacks, 30.

Having completed all the details of the West India commands, the Reporter proceeds to consider several subjects of a general nature. In the section on the number constantly sick in hospital, it is shown that out of every 1000 white troops there are 87 constantly ineffective from sickness in the Windward and Leeward command, and only 63 in Jamaica, notwithstanding the latter is far more unhealthy.

> "This peculiarity arises from four-fifths of the mortality in Jamaica being caused by fevers which rapidly terminate either in death or recovery, and only one-fifth from lingering diseases, such as those of the lungs and bowels; whereas in the Windward and Leeward command, scarcely half of the deaths are caused by fever, and almost all the others by diseases which detain the patient long in hospital. From this it will be understood how, during the ravages of epidemic fever, there may be a very great mortality without the hospital being much more crowded than usual."

The section on the influence of age and length of residence on the mortality among troops serving in the West Indies, is very interesting. Instead of the mortality decreasing with advance of age, as has been the general impression, it increases with infinitely greater rapidity than in England. The prevailing idea in regard to the advantages of seasoning or acclimatization, is opposed to numerical results. In Jamaica, for example—a station in which the strength is usually kept up by young recruits, varying from 19 to 21 years of age—the annual ratio of mortality among soldiers between the age of 18 and 25, is 70 per 1000, between 25 and 33, 107, between 33 and 40, 131, and between 40 and 50, 128 per 1000. Now, if the conservative powers of the constitution acquired strength by length of residence in unhealthy climates, the reverse ought to be the case. Similar results have been uniformly observed in all other stations, both in the torrid and the temperate zones.

In the section on the mortality and diseases of the officers serving in the West Indies, it is shown that the proportion, compared with the troops generally, is only about half as high. The only class of diseases by which officers suffer more than privates, is that of the liver. From diseases of the lungs and the bowels, officers enjoy a very marked exemption.

> "If one class of men is found to suffer more from diseases of the bowels than another, when there appears nothing in their duty or employment to create such a difference, we are naturally led to inquire into the nature of their diet; and on

ascertaining from the result of 20 years, that in the one command, where, for five days in the week it has consisted of salt provisions, the mortality by that class of diseases has been nine times as high as among the officers, while in the other, where but two days' salt provisions have been issued in the week, the mortality of these two ranks approximates so nearly as to be almost on a par, we are led to the conclusion that this cause is likely to have had some influence on the prevalence and fatal character of these diseases in the Windward and Leeward command." p. 99.

The comparative exemption of officers from diseases of the lungs, is another remarkable result. The mortality from this class of diseases among the troops is 4 or 5 times greater than among the officers—a circumstance the more unaccountable, as recruits undergo a careful examination at their enlistment. As consumption in this class of diseases is the principal source of mortality among the troops, it would seem that their great susceptibility to this malady cannot be ascribed to climate alone. As it has been demonstrated by experiment by Sir James Clark, that innutritious food and confinement in close humid places will develop tubercular affections in animals, the Reporter is led to the inference that a restriction to salt diet and confinement in crowded barrack-rooms, particularly in a tropical climate, may produce on the soldier similar effects—a condition from which the officer is exempt. The difference has been attributed by some to intemperance and exposure to night air; but to this it is replied, on the one hand, that in the East Indies, where the soldier undergoes similar exposure, the mortality is only one-fourth as great; and, on the other hand, that the non-commissioned officers, who are much less addicted to the vice of intemperance than the private soldier, suffer even a greater mortality. Hence it is inferred that the comparative exemption of the officer can be attributed neither to his non-exposure nor superior temperance. But more of this anon.

The sixth and last section contains the deductions from the preceding data. We think the reporter rather unfortunate in his conclusions, which seem to have little practical tendency. He combats the opinion that the diseases which prove so fatal to Europeans in these latitudes, especially fevers, arise from continued exposure to a high temperature. Now who, at the present day, maintains the doctrine that intermittent or remittent fever is ascribable to the agency of mere temperature? If heat alone were sufficient, these diseases would be most prevalent in the deserts of Africa. On the contrary, they are there unknown; but as we approach the Nile, where the air is moist, and the soil abounds in organic remains, they become exceedingly rife and fatal. In like manner, in our southern regions, every white man, Indian, and negro, is aware that whilst he is peculiarly subject to these diseases along the margins of streams, lakes, and marshes, he is exempt in the adjacent sandy pine woods. The British army statistics, however, prove that in proportion as the equatorial regions are approached, do febrile endemics become more prevalent and fatal—a law that is beautifully illustrated by the fact that the "sickly season" in positions north and south of the equator, in consequence of the seasons being reversed, occurs at periods precisely opposite. In the statistics of the United States' army, too, the influence of temperature in the production of intermittents and remittents is clearly demonstrated. In our southern latitudes, the annual ratio is about five-fold greater than in the northern;

and between the low temperature of the first quarter of the year and the exalted temperature of the third, a contrast equally marked is observed.

That "excess of moisture" constitutes the essential cause of the fevers of the West Indies, the reporter regards as an untenable hypothesis.

> "If the mortality of the troops depended materially on the influence of moisture, we might expect it to attain its maximum in those stations where the fall of rain was the greatest; whereas, the average mortality of the troops in Jamaica is at least double that which prevails among those in British Guiana, though the quantity of rain which falls in that island is little more than half as great."

We are not aware that febrile epidemics are ascribed to mere moisture. The Reporter does not here distinguish between the moist and the rainy season, nor does he attend to the conditions most favourable to the evolution of miasmata. To submerge completely marshy lands, it is well known, is one of the means of obviating their insalubrity. Animal and vegetable decomposition is regulated by the degree of heat and moisture combined. If moisture is increased until the air is excluded from the vegetable matter, decomposition is suspended; and the same effect is induced if the temperature is reduced to the freezing point, or increased until all moisture is dissipated. In the operation of heat and moisture there is then a wide distinction; for the former acts in proportion to its intensity, whilst the latter may prove unfavourable to the generation of malaria, no less by excess than by deficiency. We do not pretend to define the precise nature of *marsh poison*, but one fact is evident, viz: that a marshy soil, previously submerged, exposed to the action of solar heat, will develope that mysterious agent called *malaria;* and we know from experience that marshy districts in almost all countries are the *foyers* of disease, and that the deltas of large rivers are apt to teem with malarious emanations.

Again, it is alleged that the unhealthy character of these colonies cannot be accounted for by exhalations or emanations from the soil, because while the soil and its physical characters are the same in every year, the sickness and mortality are extremely variable. Now it is vain to argue from the effects of a single cause, when we admit that febrile endemics are produced by a concurrence of causes acting constantly or periodically in certain localities. Indeed the Reporter acknowledges that heat and moisture *conjoined*, although not the primary causes of fever, yet tend to increase its intensity.

These documentary reports contain a great mass of valuable information; and however we may disagree with the compiler in regard to his deductions, the facts themselves will stand unchanged, and these data will continue a source of reference to the medical philosopher when all such crude inferences shall have been long forgotten. That the duty of compiling these reports, founded on official medical documents, should have been delegated to a captain in the army destitute of professional knowledge, seems indeed strange. Although it is acknowledged that Captain Tulloch has performed the task with great ability, yet the members of the medical department of the army have just cause for expressing dissatisfaction. In the preparation of the subsequent reports, especially the medical details, the compiler acknowledges his indebtedness to the "same parties," (a deputy inspector-general of hospitals and a staff-assistant surgeon,) whose names, instead of being associated as co-editors, are buried in the smallest type of a foot-note.

The second volume of Statistical Reports is investigated in the following order:—

I. *On the Sickness, Mortality, and Invaliding among Troops serving in the United Kingdom.*

II. *Among those serving in the Mediterranean stations.*

III. *Among those serving in British America.*

I. *The United Kingdom.*—To form a just estimate of the influence of different climates on the health of troops abroad, it is requisite to determine, in the first place, their liability to sickness and mortality at home. As the troops are passing continually to and from foreign service, the Reporter, to obtain correct results, has been obliged to confine his observations principally to those regiments of cavalry which have not been serving abroad during the period embraced in this report, and the Household Troops whose service is for the most part confined to the duties of the metropolis.

Contrary to what we find in the colonies, troops at home are seldom employed on any duty not strictly military. Fatigue and working parties are rarely necessary, "and, with the exception perhaps of occasional night duty, there appears nothing in the nature of their occupations likely to operate prejudicially to health. It may safely be affirmed that they are at least better lodged, better fed, and have less onerous duties to perform, than the great mass of the labouring population." That the mortality of the soldier, who is carefully examined at his enlistment in reference to physical defects, should be lower than that of the civilian, might be readily inferred. This is not, however, the case, at least to the extent anticipated.

Among the dragoon guards and dragoons, whose average age is from 29 to 30, the annual mortality from all causes is $15\frac{3}{10}$ per 1000. Now, by the Carlisle tables, which exhibit the mortality of England in the most favourable light, the number annually decreasing out of a thousand of that age, would be about 10. By Mr. Finlaison's observations, deduced from the duration of life among the government annuitants, it is about 13. The mean of these is $11\frac{5}{10}$, which corresponds very nearly with the ratio deduced from the population returns. At first sight, this would indicate that the military profession, even under the most favourable circumstances, operates prejudicially to the human frame; but it is accounted for by the great difference between the mortality in populous towns where the troops are generally quartered, and that of rural districts, on which the above calculations as to the duration of civil life are principally founded. It is shown that the mortality of the principal towns in the kingdom is nearly one-third higher at the prime of life than among the rural population. As the civil population of these towns, even between the ages of 20 and 30, is estimated at 16 per 1000, it follows that the apparent high ratio among the troops as compared with the general mass of the population, arises not so much from any deteriorating influence in their profession, as from the disadvantage of their being subject to the insalubrious atmosphere of densely populated districts.

The admissions into hospital among the dragoon guards and dragoons, amount, on an average of 7 years, to 929 per 1000, annually. The extent and duration of sickness among the working classes have frequently engaged the attention of the British legislature. Among the workmen in the government dock-yards, the ratio of attacks of sickness among every 1000, in the course of the year, is only 407. But this striking disproportion is more apparent than real. It arises principally from the circumstance, that among soldiers every case of disease which comes under treatment, however slight, is entered on the hospital books as an admission, whereas in the dock-yards or among the working classes generally, cases are only recorded when of so serious a nature as to create an absolute disability for labour. Besides, the loss of wages consequent on such an occurrence must have a powerful tendency to reduce the number absent from sickness. With regard to the admissions into hospital among the troops, it is found that nearly two-thirds of the whole are of that class which seldom proves so serious as to incapacitate a person for the labours of civil life.

The prevalence of suicide among the dragoon guards and dragoons is truly surprising. Out of a total of 686 deaths, no less than 35, or upwards of one in 20 of the whole, have arisen from this cause, independent of many attempts which did not prove fatal. This ratio is more than five times greater than the proportion of suicides insured in the Equitable.

"This extreme tendency to self-destruction in the army will be best estimated by a comparison with the proportion of suicides in civil life in different countries, as stated by a recent statistical author.

In France	there is annually	1	suicide to	18,000	inhabitants.
Prussia	" "	1	"	14,404	"
Austria	" "	1	"	20,900	"
Russia	" "	1	"	49,182	"
In state of New York	" "	1	"	7,797	"
In Boston	" "	1	"	12,500	"
Baltimore	" "	1	"	13,656	"
Philadelphia	"	1	"	15,875	"
Dragoon guards and dragoons in the United Kingdom		1	"	1,274	

"In cities, where a large proportion of the military are quartered, the ratio of suicides is greater than in the whole population of a country, but still much below that among our troops. In the department of the Seine, (Paris,) for instance, between 1817 and 1825, the suicides averaged annually

		1 in 2,400	inhabitants.
In Berlin,	from 1813 to 1822,	1 in 2,941	"
Geneva,	" 1820 to 1826,	1 in 3,900	"
London,	" " " "	1 in 5,000	"

"Even assuming, however, the very highest average in civil life in this country, it would appear that suicides are at least five times as numerous among this class of the military. It is necessary, however, to keep in view, that instances of self-destruction rarely occur among persons under the age of 18, and are by no means so frequent among females as males—circumstances which must materially influence any comparison between its prevalence among a population of all ages and sexes, and a select body of troops from 18 to 40 years of age."

What a commentary is this on the *morale* of the army! The principal causes are the two following:—Those who fill the ranks are mostly such as have proved themselves unfit for the trusts of civil life—and the hopeless nature of the service, all enlistments being for an *unlimited* period. The higher ratio of suicides among the dragoon guards and dragoons is doubtless owing to the circumstance that these corps contain more of that class who have by dissipation or extravagance reduced themselves from a higher sphere in life to the necessity of enlisting.

The Foot-Guards.—The annual mortality of these troops, on an average of seven years, is $21\frac{6}{10}$ *per mille*, being nearly one-half higher than the dragoon guards and dragoons. This is the more remarkable, as the climate of London is not more insalubrious than many of the other towns in which troops are quartered throughout the kingdom. The average annual mortality of the civil population, between the ages of 20 and 40 is under 15 per 1000, and that of the East India Company's labourers employed there is as low as $12\frac{5}{10}$ per 1000 at the same period of life.

This excess of mortality among the foot-guards, compared with the other troops of the metropolis, arises entirely from diseases of the lungs.

> "It would appear that this high ratio of mortality, by diseases of the lungs among the foot-guards, is not a necessary consequence of residence in the metropolis, but rather originates in some peculiarity in the moral or physical condition of that description of troops, from which the others are comparatively exempt." p. 10.

Thus, by calculations deduced from the London Bills of Mortality, it has been determined that, out of 1000 deaths among the civil population, scarcely one-third of the whole arose from diseases of the lungs; whereas, among the foot guards, out of 745 deaths, upwards of two-thirds were from this class of diseases. The ground here taken is confirmed by the results afforded by the class of troops now to be investigated, viz:

The Household Cavalry.—The annual mortality of this class of troops is $14\frac{5}{10}$ *per mille.* Although exposed to the climate of the metropolis, the mortality is not so high by at least one half as among the foot guards; and, compared with the cavalry corps employed throughout the kingdom, it is even lower. While, among the foot guards, the mortality from diseases of the lungs has averaged $14\frac{1}{10}$ per 1000 annually, among this class of troops it has been but $8\frac{1}{10}$. "That the exposure of the foot guards," says the Reporter, "in a greater degree on night duty, will scarcely account for this difference, may readily be supposed from the fact that even among troops of the line serving at home, whose constitutions have in some instances been deteriorated by residence in tropical or unhealthy climates, and who have an equal share of night duty to perform, the mortality by diseases of the lungs is much lower."

The reporter now proceeds to determine general results, as a fair standard for estimating the relative mortality by the same diseases among troops in the colonies.

Fevers.—The proportion of deaths annually by this class of diseases, taking the average of dragoon guards and dragoons, the foot guards, the household cavalry, and civil life, is $1\frac{6}{10}$ per 1000. It is further ascertained that fevers are more prevalent during the summer than the winter months, in the proportion of 5 to 4.

Eruptive Fevers.—This class of diseases, once a source of great mortality in the army, is now of rare occurrence. The annual mortality is not more that two out of every 10,000.

> "It may be necessary to state, that, by the regulations for the management of regimental hospitals, the surgeon is called upon to report half-yearly, that every man, woman, and child, belonging to the regiment, bears unequivocal marks of either small or cow-pox, and he is directed to keep a register of the names and appearances, on the days of examination, of all patients vaccinated. Nothing shows the advantage of this precaution better than the fact that, in the dragoon guards and dragoons quartered throughout the kingdom, only one soldier has been attacked by small-pox in every 2000 annually." p. 12.

Diseases of the Lungs.—The annual mortality from this class may be stated at 8 per 1000, exclusive of the foot guards, which are regarded as an exception.

> "The rarity of recovery from consumption is strikingly exemplified in the fact, that, of 286 admissions among the dragoon guards and dragoons, 236 are ascertained to have proved fatal, and the remaining 50 are more likely to have consisted of re-admissions than recoveries.
>
> "Nearly four-fifths of the fatal cases of diseases of the lungs arise from consumption, being as many as from all other causes in the army at home. The highest estimates in civil life rate the mortality from this disease at a seventh part of the deaths of all ages; or, if the observation is confined to adults alone, it may possibly amount to a fourth part, being at the utmost only half as high as among the troops.
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> "That soldiers should suffer so much from this disease is remarkable, as an active life, spent for the most part in the open air, has generally a very material tendency to counteract its influence." p. 13.

Diseases of the Liver are of very rare occurrence, and productive of little mortality.

Diseases of the Stomach and Bowels also induce little mortality, the annual average being only 5 per 10,000 of the strength. It is worthy of remark, that, notwithstanding in many of the colonies the mortality from this class of diseases is not only higher than in civil life, but in some cases even as high as by all the diseases in civil life together, in the United Kingdom it is even less than among the most select of the population.

Epidemic Cholera.—The annual mortality, during the three years that it prevailed, was about 2$\frac{8}{10}$ per 1000 of the strength. It seems to have exerted its fatal influence with undeviating regularity in all localities, the ratio of deaths being the same within a fraction throughout the kingdom. The mortality, however, increased progressively with the advance of age.

Diseases of the Brain.—The annual extent of mortality from this class is 8 per 10,000, being only half the proportion which occurs in civil life.

Dropsies—The annual mortality from this source is $\frac{4}{10}$ per 1000.

On the Number constantly Sick in Hospital.—The average may be stated at 40 per 1000, which gives to each soldier 14½ days sickness annually, whilst the average duration of each attack is sixteen days. On a comparison with the results given by benefit societies, dock labourers, &c., it is found that the ratio constantly sick and the number of days' sickness to each person, are more than twice as high in military as in civil life. This arises no doubt from the circumstance that, among the former, the slightest cases of indisposition are included.

On the Influence of Age on Mortality.—Among the dragoon guards and dragoons, the mortality increases progressively with the advance of age, but by no means in so rapid a ratio as in the West India stations. To this regular progression, there are some exceptions in the other corps.

On the Mortality among Officers.—Making proper allowance for the facility with which officers can dispose of their commissions in the event of bad health, the annual ratio of mortality among the officers of the household troops, dragoon guards, and dragoons, may be stated at 9½ per 1000, being very nearly the same as among the most select class of individuals insured in the Equitable Office between the ages of 20 and 40. Among the officers of the regiments of the line on the tour of home service, during the same period, the ratio is 11 per 1000 annually.

> *On the influence of the seasons in producing sickness and mortality.*—"Notwithstanding the large proportion of diseases which are attributed to the changeable nature of this climate, the attacks of sickness are fewest among the troops during the fogs and gloom of November, and throughout the winter they are considerably under the average, even though, from their professional duties, soldiers are much exposed to its severity; while during the months of July, August, and September, when there exists that mild and serene atmosphere which *a priori* might be supposed most conducive to health, the proportion of sickness generally attains its maximum. The same feature will hereafter be shown to exist to a still greater extent in America and other regions of the northern temperate zone." p. 21.

The unhealthy influence of the *autumnal* months on soldiers is strongly corroborated by the result of a recent investigation into the relative mortality of each month in the French army. Mons. Quetelet, a statistical author, whose attention has been drawn to this peculiarity of the mortality among troops, has been at great pains to ascertain from the population returns of Belgium, whether the same law extends to persons in civil life. As the reverse of this law is established in civil life, it is inferred that, in the army, the law results from the operation of a general cause affecting the health of soldiers.

The statistics of the United States Army, which are investigated by quarterly results, show, in the third quarter, (July, August and September,) invariably the highest ratio of morbility and mortality, in every section of the country. In the southern division, the high ratio extends more into the autumnal months than in the northern.

II. *On the Sickness and Mortality among Troops serving in the Mediterranean.*

The Mediterranean stations form three distinct military commands.

1. *Gibraltar.*—The climate of Gibraltar, notwithstanding it is dry and sultry in summer, and subject to fogs and mists throughout the year, may be characterised as healthy. During a period of five years, the greatest height of the thermometer in the shade was 91°, and the minimum 50°.

> "The temperature in summer is always from 3° to 4° lower during the night than during the day—often much more; and in the morning before the sun appears above the Rock, and also towards sunset, the air is pleasantly cool and refreshing, even in the hot season. In these respects, Gibraltar enjoys a great superiority over Malta, where, though the extreme range of the thermometer is only 2° or 3° higher, there is, during the middle of summer, no perceptible reduction of temperature at night or in the morning, and the heat is much more oppressive.
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> "Though snow seldom or never falls, and ice is rarely formed, the cold is keenly felt during the winter months, especially by those who have been long resident on the Rock.
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> "The prevailing winds are from the westward and the eastward. It seldom blows from the north or south, and when from these quarters, continues but for a short time. The westerly winds are clear, dry, and refreshing; blowing directly on the town, they promote a free circulation of air, and are esteemed highly favourable to health. The easterly winds, or Levanters, as they are termed, have quite a contrary character; their baneful effects are said materially to aggravate wounds and acute diseases, and often to prove fatal to convalescents; being surcharged with moisture during their transit across the Mediterranean, they are always damp, raw, and unpleasant, and when from the southward of east, are generally accompanied with thick fogs, which envelope the Rock, and are supposed to produce the same debilitating effects as the sirocco in the upper part of the Mediterranean."

The average quantity of rain annually is 25½ inches. The rains generally commence in the end of September, or early part of October, and set in with such violence as frequently to overflow the water courses and commit great havoc in the streets of the town. The succeeding rains, which continue to fall at intervals till the end of May, are much lighter, and during the middle of summer there is seldom any, the sky is then without a cloud, vegetation becomes languid, and, unless irrigated by artificial means, generally perishes. Heavy dews and thick fogs prevail during the autumnal months, and keep up a constant dampness in the atmosphere, which renders it very unpleasant to the feelings.

The annual ratio of mortality is 22 per 1000; but in this is included the mortality occasioned by two fatal epidemics—one of yellow fever in 1828, and another of cholera in 1834. Exclusive of these, the annual mortality would not have been more than 13 per 1000. Sufficient evidence of the general salubrity of Gibraltar is afforded by the low mortality among the civil inhabitants.

Epidemic or Yellow Fever.—Among the medical officers of this station, great diversity of opinion obtains upon the question whether this disease is of local origin, and merely an aggravated form of the remittent fever, or of a contagious nature introduced by ships from foreign ports.

> "The first appearance of this epidemic, of which we possess any specific details, was in August, 1804, but till the end of September it did not become so prevalent as to call for the notice of the public authorities. It then rapidly increased till the end of October, when it reached the maximum, after which it gradually diminished in frequency and severity, and ultimately disappeared in the end of December or beginning of January. In this instance, however, it seems rather to have died away from want of subjects than from any mitigation of the causes by which it was induced—for after the most diligent inquiry, only 28 adults could be discovered within the garrison who had escaped the malady, and it very rarely attacks the same person twice. A manuscript journal of the events of that period states that neither wind, rain, nor any change of weather, had the smallest effect in checking its ravages or diminishing its malignity; about one-third of the troops who were attacked died, and of the civilians a still greater proportion. The total number of deaths during its continuance amounted to—

Officers - - - -	54
Soldiers - - - -	864
Soldiers' wives and children -	164
Civilians - - - -	4864

> "We cannot state the precise number of each class so as to ascertain the ratio of mortality, but about a fourth part of the troops and more than a half of the civil inhabitants were cut off. To the precaution of encamping the former out of town, which was adopted on the 26th of September, is probably to be attributed their not having suffered to so great a degree as the civilians who remained constantly within the garrison." p. 8.

A similar disease appeared in 1810, when only 6 died. It made its appearance again in 1813, cutting off 461 of the troops, and 883 of the inhabitants; and again in the following year, causing the loss of 114 of the military, and 132 of the inhabitants. The garrison suffered from no similar visitation until 1828, when the epidemic carried off 515 of the military, (including 83 women and children,) and 1281 civilians. In all these instances, as soon as the troops were removed to encampments on the "Neutral Ground," they became in a measure exempt, notwithstanding it continued to rage in the town. In 1813, and in 1828, the mortality attained its maximum on the 16th of October, and in 1804 about a week earlier.

> "Without venturing an opinion as to whether this epidemic is one *sui generis*, or merely an aggravated form of remittent fever, there is one marked peculiarity to which it is necessary to advert. In Gibraltar the same individual has seldom been attacked twice, even though a long series of years may have elapsed since he first suffered from it, but in the West Indies, and on the west coast of Africa, a former attack of remittent fever secures no such immunity—indeed it could be proved, by reference to the returns from these stations, that in many corps every soldier must have been treated, on the average, twice or thrice for remittent fever during the few years of his service there." p. 9.

We have already remarked that at New Orleans one attack of yellow fever is believed to secure an immunity against the second. As the author makes no distinction between the bilious remittent fever of warm climates and the genuine *febris icterodes*, we do not see what bearing the fact that every soldier may have been treated twice or thrice for remittent fever, has upon the subject. In the British reports, the medical officers pursued an arbitrary classification, some considering "bilious remittent fever" a better nosological term than "yellow fever." Much of the obscurity in relation to yellow fever may arise from the circumstance that the appellation has been bestowed upon diseases entirely distinct, though resembling one another in their most striking features.

The cause of this disease at Gibraltar is still involved in much obscurity. To meteorological observations, which, for many years, were made with great care, we look in vain for a solution of the mystery. Though no marked diminution, either in prevalence or severity, could be distinctly traced to the occasional reductions of temperature which took place during the continuance of this disease, yet it may be proper to observe that these epidemics have never been known to make their appearance at this station during winter, and have always declined in severity as that season approached. It further appears that a removal, even to a small distance from the town, secured a complete immunity from the epidemic. In the present state of our knowledge, we are not justified in saying that the same miasm which produces remittent fever, can, in its more aggravated state, excite yellow fever, nor indeed that the latter is of paludal origin.

> *Diseases of the Lungs.*—"The ratio of admissions by this class of diseases is to that in the United Kingdom as 141 to 148, the principal difference being that catarrhal affections are less frequent in Gibraltar, while inflammation of the lungs is much more so; the cases of the latter are, however, of a milder character, as only 1 in 45 died of those admitted into hospital in Gibraltar, while 1 in 18 died of those admitted for the same cause among the dragoons guards, and dragoons in the United Kingdom. The total mortality by diseases of the lungs would appear to be less at this station than at home; but that, we apprehend, arises from many of the consumptive patients being invalided, who, if they die on their passage, or after their arrival in Britain, are not included in the returns of the station where their diseases originated." p. 11.

Diseases of the Liver.—This class of diseases is, only in a very slight degree, more prevalent or fatal than in the United Kingdom.

Diseases of the Stomach and Bowels.—Compared with the results given in the United Kingdom, it would appear that this class of diseases is twice as prevalent and thrice as fatal. Salt meat, more than increased temperature, is assigned as the cause by the Reporter.

Epidemic Cholera.—In a strength of 3048, there were 459 cases and 131 deaths, being one in 3½.

> "The medical officers seem to have been almost unanimous in their opinion that the disease was not contagious. In the same ward with the cholera patients in the civil hospital were several persons labouring under other diseases, who, although in constant communication with, and frequently in attendance on those suffering under the epidemic, were in no instance affected by it. In the military hospital, too, it was observed that the orderlies employed in attendance on the sick were not attacked in a greater proportion than others who were not so employed.
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> "It may also be stated, as another evidence on this subject, that, of 30 medical officers in constant attendance on the sick during the prevalence of the epidemic all of whom, from the nature of their duties, were subject to great fatigue and anxiety, only one or two exhibited any symptoms of the disease, and these cases were comparatively slight. p. 14.

Diseases of the Brain.—The proportion admitted is the same as among the dragoon guards and dragoons, whilst the ratio of deaths is even lower.

Dropsies.—The ratio of admissions and deaths is exactly the same as in the United Kingdom.

Venereal Affections are exceedingly rare, the ratio of admissions being scarcely one-third as high as among troops at home. Although the strictness of the police regulations for the exclusion of all females likely to communicate these diseases, may in some measure account for this comparative exemption, yet it may be inferred that this climate, like that of the West Indies, may be unfavourable to their existence or propagation.

Black Troops.—In 1817, the Fourth West India regiment was sent to form part of this garrison, under the expectation that this class of troops would prove extremely useful in relieving the British soldiers from such duties as subjected them to exposure during the heat of the day. An experience of one year and ten months afforded, however, a striking instance of the unfitness of the constitution of the negro for any other than his native climate; for the annual ratio of mortality was 62 *per mille*, being at least four times as high as that of the European troops in Gibraltar during the same period. More than nine-tenths of the deaths arose from diseases of the lungs and the bowels.

2. *Malta.*—This island contains neither river nor lake, and has, from its geological structure and the absorbent nature of the soil, but little marshy or swampy grounds. There is no exuberant vegetation, brushwood, or forest; the verdure is scanty, and the greater part of the surface presents nothing to view but the arid rock.

> "Malta, being much exposed to the influence of the hot winds which sweep over the deserts of Africa and the sandy coast of Egypt and Syria, is subject to a higher temperature, particularly during the summer months, than is usual in the latitude of that island; indeed, the heat at that period is little inferior to what is experienced in tropical regions. This high degree of temperature exists not only during the day, but, owing to the radiation of the heat absorbed by the rocky surface of the ground and the thick stone walls of the buildings, continues, with very little abatement, even after the solar influence has ceased; and sometimes, for a period of several weeks together, the thermometer maintains, during the night, the same height as throughout the day, creating thereby a feeling of extreme lassitude and oppression among all classes of residents." p. 18.

The range of the thermometer, on an average of five years, is from $52\frac{1}{2}°$ to 86° Fahr. In regard to the quantity of rain which falls, the Reporter possesses no data.

> "In September there are frequent showers, increasing in frequency during October and November; but from December to February the rain falls with nearly the same violence as in the tropics, and the atmosphere continues surcharged with moisture till March; it then begins to clear, and during the five following months scarcely a drop falls, and the sky is generally without a cloud.
>
> "The most prevalent winds in Malta are from the southeast, south, and northwest. That from the southeast, termed the sirocco, is the most common; and the disagreeable effect it produces on the human frame is frequently adverted to in the medical reports. It prevails principally during the autumnal months. There is no regular land and sea-breeze, which, in some southern stations, serves materially to modify the temperature." p. 18.

This island seems to be less salubrious than Great Britain; for the annual ratio of mortality among the inhabitants is nearly $2\frac{5}{10}$ per cent., whilst in England it is only $2\frac{2}{10}$ per cent. But besides the mortality of ordinary years, on which the above estimate is founded, Malta, in 1813, suffered from the ravages of the plague, which cut off 4486 of the inhabitants, between April and November; and in 1837, cholera broke out, which also carried off several thousand.

Including the deaths from accidental causes omitted in the medical returns, the annual ratio of mortality among the troops is $18\frac{7}{10}$ *per mille*—a sufficient proof that the climate of Malta does not deserve the character for salubrity so generally assigned to it. We have already shown, says the Reporter, by reference to the mortality among the natives, that it is much the same, in this respect, as the other states in the south of Europe, and the extent of mortality among the troops, during the above period of 20 years, sufficiently corroborates that deduction. Notwithstanding the mortality is less than at Gibraltar, the extent of sickness is greater, the excess being principally among those diseases which seldom prove fatal.

Fevers.—The troops at this station suffered more from fevers than at Gibraltar, excluding the epidemic of 1828, and twice as much as those at home.

Diseases of the Lungs.—Having given the usual tabular view of this class of diseases, the Reporter observes—

> "The climate of this island appears from the preceding results to be by no means favourable to persons predisposed to these diseases: the mortality is higher than in Gibraltar, and there is every reason to believe that could we have taken into account the number invalided, and who died on their passage, it would have proved even higher than at home. It is somewhat remarkable that, in a climate where the thermometer never sinks to the freezing point, where the temperature at night is generally within a few degrees the same as during the day, and where those sudden transitions from heat to cold, to which this class of diseases is generally attributed in other countries, are exceedingly rare, the ratio of admissions should be only about one-fifth less than in the United Kingdom.
>
> "It may serve as a striking illustration how little influence the climate of Malta is likely to have in diminishing the tendency to consumption, that the proportion attacked by that disease among the troops there during the last seven years, has averaged $6\frac{7}{10}$ per thousand of the strength annually, while in the United Kingdom, during the same period, the proportion attacked of the dragoon guards and dragoons was but $6\frac{4}{10}$ per thousand annually. Nor is the fatal influ-

ence of diseases of the lungs confined to the troops alone; it extends in a corresponding degree to the inhabitants."

Having given a table of the pulmonary diseases reported among the civil population, the Reporter adds—

> "This total of 6664 deaths in 13 years, shows the mortality to have been 513 annually, which upon an average population of 100,000 of all ages, is about $5\frac{1}{8}$ per 1000 of the strength, being scarcely one per 1000 less than among the troops, notwithstanding the night exposure of the latter in the course of their military duties.
>
> "Though the climate of this island has been supposed favourable to diseases of the lungs, its inhabitants appear to suffer from them nearly as much as those of high northern latitudes; for the returns of Sweden show that there were only 14,087 deaths from this class of diseases out of the whole population in one year, being in the ratio of $5\frac{6}{10}$ per 1000, or within a fraction the same as in Malta."

For the present we shall merely say that these comparisons and influences are unwarranted by the data. In our concluding remarks we will show the fallacy of the comparisons in which the ratio of the United Kingdom is taken as the standard, and the still greater fallacy of the comparison between the British troops and native population. The cases of *marasmus*, which "occurred principally among children and old persons," have been included under the head of *consumption*, in the tables of the civil population of Malta!

Diseases of the Stomach and Bowels.—This class of diseases prevails to a considerable extent, but not in very aggravated forms. As in the Report of the West Indies it was stated that these affections produced comparatively little mortality either among the officers or civil inhabitants, so it was inferred that among the soldiers it was, perhaps, not so much attributable to the influence of climate as to the quality of the diet to which they were restricted. We now possess an indirect proof of the accuracy of these deductions in the fact, that in Malta, where the troops enjoy the advantage of fresh provisions, the mortality among them by diseases of the bowels does not exceed that of the civil inhabitants. Although no diet, however simple or well regulated, will secure to the soldier an entire immunity from diseases of this class when exposed to a high temperature in tropical climates; yet it is apparent that the same quantity of salt meat, which might be consumed in northern regions with comparative impunity, may, in warm latitudes, prove an active source of disease. In the United States, diarrhœa and dysentery are much under the influence of season and climate. Like intermittent and remittent fever, the ratio augments with the increasing temperature of season and the decrease of latitude. In the southern regions, the annual ratio of diarrhœa and dysentery is more than twice as high as the northern; and, taking the general average of the United States, the ratio of the third quarter is more than threefold greater than that of the first.

Diseases of the Brain.—The ratio of admissions and deaths by this class of diseases very nearly corresponds with the average of the United Kingdom and Gibraltar. In Malta, as in England, the mortality from this cause is twice as high among the civil as the military population. It would seem that high temperature exercises little or no influence upon cerebral affections.

Malta Fencibles.—In this corps, composed entirely of natives enlisted for a limited period of service, the annual ratio of mortality is only 9 per 1000. As this is less than half the mortality among the troops of the line, it strikingly demonstrates the exemption enjoyed by soldiers composed of the indigenous inhabitants of a colony, compared with those foreign to the climate.

> "The Maltese use very little animal food; bread, with the vegetables of the country, and occasionally a little fish, forms their principal sustenance; and the healthy and efficient state of the corps may no doubt be partly attributed to the important circumstance that, in becoming soldiers, they have not been required to change the simple diet which nature seems to have pointed out to the inhabitants of all southern latitudes as most conducive to their health." p. 29.

3. *Ionian Islands.*—The islands comprised in this military command are Corfu, Paxo, Santa Maura, Cephalonia, Ithaca, Zante, and Cerigo. The physical aspect of these islands is very much alike. Mountainous, rugged, and for the most part comparatively barren, they, at first sight, present nothing to the view but masses of bare rock, broken into abrupt and picturesque forms, and intersected by deep clefts and ravines, which occasionally open into valleys of limited extent.

> "As these islands, with the exception of Cerigo, do not differ materially in geographical position, there is but little difference in the nature of their climate. Like all mountainous regions, they are subject to sudden atmospherical vicissitudes; the extremes of cold and heat, dryness and moisture, tempestuous and calm weather, often succeeding each other in the space of a few hours. * * * * The degree of heat at particular seasons is greatly influenced by the direction of the wind. When from the north or northeast it is generally cool and pleasant, but from the south or its collateral points it is hot and humid, often accompanied by mist and rain, and not unfrequently by the sirocco, during the continuance of which not only is vegetable life parched and languid, but the animal powers succumb to its influence. Patients previously convalescent are apt to relapse, ulcers and wounds become more difficult of cure, and every type of disease, but particularly remittent fever, assumes a more aggravated form." p. 30.

The mean temperature of each month, on an average of 10 years, ranges from 52° (February) to 81½° (August). But the extremes of heat and cold are said to be much more sensible to the feelings than is indicated by the mere range of the thermometer. Of the annual quantity of rain we possess no exact measurement, but it appears to be rather under than above the average in similar latitudes.

The climate of these islands has proved much more inimical to British troops than that of the other Mediterranean stations. Compared with Malta, the annual ratio of mortality per 1000 is as $28\frac{3}{10}$ to $18\frac{7}{10}$, and with Gibraltar as $28\frac{3}{10}$ to 22. Among the natives of the Ionian islands, however, the mortality does not appear to be higher than among those of Malta or the south of Europe.

Fevers. One of the leading features of the climate of the Ionian isles, is the prevalence and fatal character of this class of diseases, to which alone nearly one-half of the admissions and deaths are attributable. By remittent fever, 9 per 1000 of the strength have been cut off annually, though not more than one in three thousand has died from the same cause in Malta, or even in Gibraltar, if we exclude the epidemic of 1828. This disease, though not so prevalent, is nearly as fatal as in the West Indies, 1 in 11 having died of all those attacked, and occasionally at some of the stations, even as many as 1 in 3. Its prevalence is confined mostly to the months of July, August, September, and October, whilst the remittent fever of the West Indies and Africa rages with great severity at all seasons, though more commonly from July to October. It is stated that those who have had remittent fever in the summer are particularly liable to intermittent in winter, even if they have removed to a station where the latter is otherwise rare. The same fact was observed in the cases of fever which proved so fatal to the British troops at Walcheren.

> *Diseases of the Lungs.* "Notwithstanding the variable character of the climate, the rapid alternations of temperature, and the tempestuous weather which frequently prevails in this command, diseases of the lungs are both less prevalent and less fatal than at Malta or Gibraltar: the admissions into hospital by that class of diseases in these three commands being respectively as 90, 120, and 141, and the deaths as $4\frac{8}{10}$, 6, and $5\frac{3}{10}$ per 1000 of the strength annually. The principal exemption in the Ionian islands is from catarrhal affections, which are not half so prevalent or half so productive of mortality as in the other Mediterranean stations, or in the United Kingdom. Most of the deaths arise from consumption; but neither is the proportion attacked so high, nor the fatal cases so numerous as in Malta, where there exists a comparatively equable temperature, and that mild condition of the atmosphere which is supposed favourable to persons predisposed to that disease. * * * It is stated in many of the Medical Reports that, owing to the sudden and frequent atmospherical vicissitudes in this climate, inflammation of the lungs is extremely frequent and fatal. The result of these investigations, however, establishes that it is not more so than in other stations which are less liable to such vicissitudes." p. 35.

But more of this anon.

The remaining diseases, classified in the usual manner, do not present any characters different from those generally exhibited in the Mediterranean stations.

Plague.—This terrible disease has not prevailed in any of the Ionian islands since 1817. Unlike the ordinary course of febrile epidemics, it seemed to be wholly uninfluenced by the seasons, being just as virulent in the middle of winter as in the opposite season, nor did it become more mild in character as the epidemic was about to disappear. We possess no exact statement of the mortality induced; but it is stated in Gregory's "Practice of Physic," that among 700 attacked in the district of Leſtimo, only 70 recovered. Whilst some maintain the doctrine of importation and subsequent propagation by contagion, others held that it is attributable to the operation of some unappreciable atmospherical agency.

Having concluded his observations in reference to the command generally, the Reporter next examines in detail the statistics of each station, viz. Corfu, Paxo, Santa Maura, Cephalonia, Ithaca, Zante, Cerigo, and Parga, and thus determines their relative salubrity. In the "General Summary," he gives a table for the purpose of showing how inadequately the operation of any general cause, as heat or moisture, accounts for the striking difference of mortality in the same years, at stations in the same vicinity.

> "Here then we find that, instead of extending over the whole command as they would be likely to do if resulting from the operation of any general cause, the sudden accessions of mortality which occasionally take place are frequently confined to one island, while others, in the immediate vicinity, are exempt. In 1818, for instance, when 50 per 1000 of the strength died at Zante, the mortality at Cephalonia, only a few miles distant, was but 9 per 1000. In 1817 and

1819 the troops were unhealthy both at Santa Maura and Zante, while those of Cephalonia, lying between them, experienced no more than the usual degree of mortality, and in 1828 and 1829, though a fourth part of the force was cut off at Santa Maura, those at Corfu and Zante were subject to no great degree of sickness, and even those in Cephalonia, immediately adjacent, did not suffer in any marked degree. Various other instances of a similar nature might be quoted." p. 54.

On the Influence of Age and Length of Residence on the Mortality of Troops serving in the Mediterranean.—It appears that the mortality increases with the advance of age at all these stations in a much more rapid ratio than in the United Kingdom. This is particularly observable at Malta, where the increase is nearly as rapid as in tropical regions. The rapid increase of mortality with the advance of age in each of these three commands, sufficiently demonstrates that in the Mediterranean, as in the West Indies, troops do not suffer less in proportion to their length of residence, but the reverse. The doctrine of acclimatization, therefore, falls to the ground, when subjected to the test of numbers. Even febrile diseases, in which the advantage of length of residence in warm climates is supposed to manifest itself most strongly, increase with almost as uniform a progression as that which regulates the law of mortality at different ages.

Deductions from the preceding Report.—In regard to pulmonary diseases, the Reporter remarks—

> "The mild climate of the Mediterranean has generally been considered favourable to the cure or prevention of consumption, and other pulmonary affections. To ascertain whether this supposition is well founded, or the reverse, is manifestly an object of much importance to medical science, and can only be determined by investigations extending over a long series of years, and including large masses of individuals. The experience of civil practitioners, however carefully recorded, is on too limited a scale to warrant general conclusions on a subject of such magnitude; yet, hitherto, no other source of information has been available for that purpose, and it is not surprising, therefore, if their conclusions, when submitted to the test of numerical calculation, are, in many instances, found to be erroneous." p. 63.

Having given a table showing the relative prevalence of consumption among the troops in the Mediterranean and the United Kingdom, the Reporter proceeds—

> "This affords so accurate a standard of comparison as to place beyond a doubt the interesting fact, that, except the Ionian Islands, the liability of troops to consumption in the Mediterranean stations is even greater than in the United Kingdom. We have not compared the deaths by consumption for a similar period, because conclusions could not have been drawn in regard to the relative mortality with the same accuracy, so many laboring under that disease having died on their passage home or after their arrival in this country; but from all the information we have been able to obtain there can be no doubt that if due allowance is made for these casualties, the proportion of deaths also, among those attacked by consumption, will be found fully as high in the Mediterranean as in the United Kingdom.

* * * * * * * * *

> "These facts offer a striking contradiction to the popular idea regarding the influence of sudden atmospherical vicissitudes and rapid alternations of temperature, in inducing this disease; but it is even more remarkable that similar results should be obtained in regard to the relative prevalence and mortality by pleurisy and inflammation of the lungs, which are supposed to be still more influenced by these agencies. * * * * Here, then, we find that inflammatory affections of the lungs are nearly twice as prevalent in the Mediterranean as among the

same number of troops in the United Kingdom, and that in the mild climate of Malta they are also twice as fatal.

> "These facts, combined with a careful examination of the Abstracts in the Appendix, lead to the inference that residence in the Mediterranean, though so often recommended to patients labouring under pulmonary affections, is by no means likely to be attended with beneficial results: in some cases, no doubt, change of air, change of scene, and the sea-voyage, may have benefitted a patient, and led to a partial recovery, but the same would in all probability have taken place wherever he had been sent, it being by no means likely that any beneficial influence can be exerted by the climate itself, when a body of selected soldiers, subject to no severe duty and exposed to no hardships, lose annually a larger proportion of their number by consumption than in the United Kingdom." p. 64.

These extracts are not made in commendation, but to exhibit fairly the Reporter's views, to the end that the reader, in the sequel, may be enabled to perceive that mere figures are not facts, and that unless deduced from correct data they serve only to mislead.

III. *On the Sickness and Mortality among the Troops in British America.*

The stations occupied by the British troops on the Continent and the Coast of North America form four military commands:—1. The Bermudas; 2. Nova Scotia and New Brunswick, including Cape Breton and Prince Edward's Island; 3. Upper and Lower Canada; and 4. Newfoundland.

1. *The Bermudas.*—These islands lie about 600 miles to the east of South Carolina, in lat. 32° 25′ N., long. 64° 50′ W. They are said to exceed 300 in number, but most of them are barren rocks, four only being of sufficient importance to be garrisoned by troops, viz. St. George, the Main, Somerset, and Ireland Island.

Although very destitute of soil, which generally consists of the debris of marine shells mixed with sand and vegetable mould, yet a considerable part of these islands, particularly on the southern side, is covered with forests of lofty cedar. There is little cultivation, and the produce consists principally of arrow-root, Indian corn, yams, and potatoes.

> "The climate of the Bermudas has been described by some authors as a perpetual summer. This description, however, appears to be rather overstrained; compared with the climate of northern regions, or even of the adjacent coast of America under the same latitude, it is certainly uniform; but the summer is exceedingly hot, even more so than in the West Indies, probably attributable to the light and scanty nature of the soil, which, being speedily divested of vegetation by the influence of solar heat and the absence of moisture, reflects the sun's rays from its arid surface with increased intensity. The absence of the regular trade winds, which serve to modify the heat in the West Indies, has by some been supposed another cause of the high range of temperature during the summer months, but this seems by no means probable in a climate where there is rarely a calm, and strong winds generally prevail from one quarter or another." p. 3.

The temperature of the summer months in the Bermudas, compared with that of British Guiana, which is 1500 miles to the south, exhibits an excess of several degrees.

> "The limited extent and moderate elevation of the Bermudas leave them exposed to every breeze, and, in these regions, calms are seldom of long continuance. Southerly winds are most common during the summer, and are

said to be damp and oppressive; those from the northeast frequently blow with great violence during winter, and are dry, cold, and in many instances too keen for invalids. Winds from the west and northwest are most common in spring and autumn, and, when from the latter point, are generally accompanied by heavy falls of rain or thunder-storms." p. 4.

The annual ratio of mortality, according to the War Office Returns, is $32\frac{1}{3}$ per 1000 of the strength; but this includes an epidemic of yellow fever, in 1819, by which a fourth part of the force was cut off in a couple of months. We may here remark that, with the exception of the statistics of the United Kingdom, nearly all the results are based on an average of twenty years.

Fevers.—If we exclude the sickness and mortality by yellow fever in 1818 and 1819, the other types of fever will be found less frequent and less fatal than at any of the Mediterranean stations; and, notwithstanding the numerous marshy situations in some of these islands, fevers of the intermittent form are almost altogether unknown. Eruptive fevers are exceedingly rare, only two cases being reported in the course of twenty years.

Diseases of the Lungs.—"Though this class of diseases, when taken in the aggregate, does not appear to be very prevalent in these islands, yet the most dangerous of them, viz. inflammation of the lungs and consumption, are decidedly so, and hence the above ratio of mortality is unusually high, being $8\frac{7}{10}$ per 1000 of the strength annually, which is more than among troops in the United Kingdom, or any of the Mediterranean stations.

"This appears more remarkable when we consider the uniformity of temperature at the Bermudas during a great part of the year, and the absence of those extremes of cold to which such diseases in northern latitudes are frequently attributed. It is sufficiently demonstrative of the erroneous nature of the ideas generally entertained on this head, particularly as regards consumption, that 9 per 1000 of the troops at this station are attacked annually by that disease, of whom nearly three-fourths die before an opportunity offers for their removal, while in Great Britain the proportion attacked annually is but $6\frac{4}{10}$ per 1000." p. 7.

Hepatic Affections are twice as prevalent and twice as fatal as in the United Kingdom.

Diseases of the Stomach and Bowels are even more prevalent than in the windward and leeward command, but less severe in character. Their prevalence is attributed to the inadequate supply of fresh provisions.

Diseases of the Brain, if we deduct the cases and deaths reported under the head of *delirium tremens*, are, notwithstanding the high temperature, exceedingly rare.

Venereal Affections.—Of these the ratio is remarkably low—an exemption which cannot, as at some stations, arise from any sanatory regulations.

2. *Nova Scotia and New Brunswick.*—The peninsula of Nova Scotia, which is about 280 miles in length, and from 50 to 100 in breadth, is perfectly insular, except the point—a strip of land only eight miles in width—which connects it on the northwest with the province of New Brunswick. The superficial area of this peninsula is computed at 15,600 square miles, of which not a twentieth part is cleared, or under cultivation. Its physical aspect is generally undulating, but the loftiest range of mountains does not exceed 800 feet. The south and west coast are deeply indented with numerous bays and lagoons by the action of the Gulf Stream,

which, rushing upon this portion of the continent in tides of from 60 to 70 feet, overflows the country to the distance of several miles, and converts the mouth of streams, fordable at low water, into extensive arms of the sea where whole fleets might ride at anchor.

> "As a necessary consequence of this phenomenon, a very considerable portion of the banks of the rivers and the heads of the bays on that side of the peninsula, is constantly in a marshy state, and as these tides are thickly impregnated with alluvial soil, owing to the force with which they are impelled against the adjacent continent, they leave on their reflux a considerable deposit of mud, which, by the aid of embankments, is converted into rich meadow land; and even where no such care has been taken, spontaneously supplies a coarse winter fodder for cattle.
>
> "Though the southeast coast may therefore, from the nature of its soil and surface, be considered as in a great measure free from the agencies supposed to give rise to malaria, yet the western coast, particularly around Windsor and the head of the Bay of Fundy, abounds in them in no ordinary degree, both as regards marshy land, and a muddy surface exposed during summer to the action of a high temperature. The interior of the peninsula, too, is so much intersected by lakes and bays, that nearly one-third of its surface is under water, yet the inhabitants enjoy a remarkable degree of health, and an almost total exemption from those intermittent and remittent fevers, which, as we shall hereafter have occasion to show, affect the constitution in Upper Canada to so remarkable an extent.
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> "The climate of this province is distinguished by great and sudden alternations of temperature, such as, even in the changeable climate of Britain, appear almost incredible; though Nova Scotia is in this respect less remarkable than some of the North American stations, the thermometer has been known to exhibit a difference of 52° in 24 hours. The atmosphere is also exceedingly moist, the showers heavier and more frequent than in Britain, and fogs are common along the sea-coast throughout the year, but particularly in May and June, though they seldom extend any distance into the interior.
>
> "Though the winter is no doubt exceedingly severe, as compared with that of Great Britain, yet the cold is not by several degrees so intense as in that part of the American continent farther to the west, neither is the heat of summer so great, *probably*, attributable to the insular situation of the province having a tendency to modify both these extremes, the thermometer is seldom lower than 6° or 8° below zero in winter, or above 88° in summer, but we possess no table sufficiently accurate to exhibit its precise range for a series of years."

The modified climate of Nova Scotia is, *of course*, attributable to its insular position, and to its being extensively intersected by lakes and bays. Some influence is also to be ascribed to the Gulf-stream, which strikes upon this part of the coast.

> "The prevailing winds are from the east in the spring, from the south or southwest in summer and autumn, and from the north or northwest in winter, at which period a change to any other quarter is generally followed by a rapid rise in the thermometer, accompanied by much rain or snow.
>
> "From December to the end of March the ground is generally covered with snow. Summer follows winter in such rapid succession, that there is scarcely any spring, but the autumn is pleasant and sometimes of long duration, as, towards its termination, there is frequently a continuance of what is termed the Indian summer, till December again ushers in the winter with its usual severity." p. 11.

The Reporter next gives the medical topography of the military stations of Nova Scotia, viz., Halifax, Windsor, Annapolis, and the adjacent islands of Cape Breton and Prince Edward.

New Brunswick.—This province, which comprises nearly 14 millions of acres, is united to Nova Scotia by the narrow strip of land referred to above. It differs from that peninsula in being composed of bolder undulations, which in some parts assume a mountainous character, and it has been brought less under cultivation.

The troops are principally quartered at St. Johns and Fredrickton.

> "The climate of New Brunswick, particularly at Fredrickton, is not liable, during winter, to such sudden vicissitudes as that of Nova Scotia. The frost is steadier, and the winter more severe as well as of longer duration; the heat of summer is also more intense, and the thermometer, in the course of one year, has been known to range from 96° above to 42° below zero, though these extremes are considerably beyond the usual average.
>
> "As in Nova Scotia, fogs are common along the sea-coast of New Brunswick, particularly in the months of May and June, but seldom extend any distance into the interior, nor do they appear in the slightest degree prejudicial to health, the stations most exposed to them being quite as free from sickness as any other part of the command." p. 13.

The annual ratio of mortality in Nova Scotia and New Brunswick, on an average of 20 years, is according to the Medical Reports, $14\frac{7}{10}$, and, according to the War-office Returns, 18 per 1000.

Fevers.—These are mostly of the common continued type which is found to prevail in every climate. So rare are intermittents that not two cases occur among the whole force annually, and these have in almost every instance been traced to individuals who had previously suffered from them in Upper Canada. As the soil of Halifax is arid and rocky, this exemption might be expected there; but it is surprising that it should extend equally to the troops and inhabitants of Windsor, Annapolis, Fort Cumberland, and Fredrickton—situations abounding with those supposed sources of malaria, which, in the provinces of Upper Canada, are found, or at least supposed to produce fevers of the remittent and intermittent type.

In the statistics of the United States Army, the same contrast, as regards the prevalence of intermittent fever, is found to exist between the posts on the coast of New England and those on our northern chain of lakes. Whilst in the former region, intermitting fever is almost unknown, scarcely a case reported being of domestic origin, the disease, in the latter, is very rife. At Fort Gratiot, situated at the outlet of Lake Huron, for example, the annual ratio of cases is 72 per 1000 men. As respects remittent fever, however, the average on the lakes is but little higher than on the coast of New England.

Diseases of the Lungs.—It is remarked by the Reporter that notwithstanding the severe winter and sudden atmospherical vicissitudes, peculiar to Nova Scotia and New Brunswick, diseases of the lungs are less prevalent in the proportion of 125 to 148, and less fatal in proportion of $7\frac{1}{10}$ to $7\frac{7}{10}$. Were any other proof necessary to show how little even the most acute of these diseases seems to be aggravated by such atmospheric influence, it would, according to the mistaken views of the Reporter, be found in the relative proportion treated for inflammation of the lungs and pleurisy in this command, compared with the Mediterranean and Bermuda—climates remarkable for their mild and equable temperature.

Diseases of the Liver, and of the Stomach and Bowels. The prevalence of these two classes of diseases is about the same as among the dragoon guards and dragoons serving in the United Kingdom; but the mortality by the former is only half as high, whilst that by the latter is twofold greater.

Epidemic Cholera. In 1832, when the disease raged with great severity in Canada, the troops in this command escaped it; but in 1834, it broke out among those at Halifax. It is worthy of remark that in two instances in which troops suffering from this malady were removed only a few miles, it quickly disappeared. Although the circumstances under which the disease first appeared were such as to favour the idea of contagion, yet nothing occurred in the course of its progress to strengthen that supposition.

3. *Canada.*—This military command, which includes the provinces of Upper and Lower Canada, is of so vast an extent as to preclude anything like a geographical description.

> "The climate of the lower province is distinguished for the extreme severity of its winter, and the sudden alternations of temperature to which it is subject; so remarkable are these, that at Quebec the thermometer has on some occasions been known to fall 70° in the course of 12 hours; the cold weather sets in as early as November, and from the end of that month till May, the ground remains covered with snow to the depth of 3 or 4 feet. During this period there is generally a clear dry atmosphere, with light northwesterly winds or calm weather, and the sensation of cold is by no means so acute as might be anticipated from the low range of the thermometer; but when the wind blows from the northeast, especially with any degree of violence, the intensity of the frost becomes so excessive, that on several occasions the mercury, frozen in the thermometer, has no longer served to record the extreme reduction of the temperature. The general range, however, during winter, is from the freezing point to 30° below zero.
>
> "Though there is seldom a complete thaw in winter, yet occasionally, when the wind changes to the southward and eastward, the usually clear and serene sky becomes overcast, the atmosphere damp, and a considerable rise in the thermometer takes place, accompanied by thick fogs and a heavy fall of snow. The seasons do not glide imperceptibly into each other as in more temperate regions; summer succeeds so rapidly to winter that the thermometer sometimes rises to 80° degrees at mid-day before the ground is clear from its covering of snow.
>
> "Summer commences about the middle of May, and is usually ushered in by moderate rains and a rapid rise in the temperature, though the nights still continue cool; but during June, July, and part of August, the heat is great, indeed often as oppressive as in the West Indies, the thermometer frequently attaining to 95° in the shade; in these months the rain is never excessive, nor of long duration; the earth, already saturated by the melting of the snow, requires no further supply of moisture to aid the rapid progress of vegetation." p. 20.

Upper Canada may be said to extend from the Hudson's Bay Territory, in latitude 46°, on the north, to that of the United States, latitude 42° on the south; and from the river Ottowa and boundary of Lower Canada on the east, to the distant shores of the Pacific. A region of such extent necessarily presents considerable diversity of climate. Compared with Lower Canada the Reporter observes as follows:

> "It [the winter] is, in general, shorter by at least two months, while spring and autumn are lengthened in a corresponding proportion. The frost is, perhaps, for a few days as intense, but never of such duration; and thaws occur at short intervals. Snow seldom falls in any quantity till towards the end of December, and usually disappears in March; and the severity of the winter is said

> to have perceptibly diminished of late years, as the surface has been cleared and brought under cultivation.
>
> "The climate is generally more equable than the lower province; and though the thermometer ranges higher by a few degrees, the summer heat is not so oppressive, probably owing to the influence so vast a body of water is likely to exert in modifying the temperature, and to the cooling breeze which prevails along the lakes during the day." p. 22.

The influence of these ocean-lakes, which contain an area of 93,000 square miles, upon climate, is no longer a doubtful question. In the "*Army Meteorological Register*," published by Surgeon General Lawson, the subject is satisfactorily elucidated. Proceeding from the Atlantic ocean westward, the variations of the *isotheral* and *isocheimal* curves—the lines of equal winter and summer temperature—afford a beautiful illustration of the equalising tendency of large bodies of water. On the coast of New England, the ocean modifies the range of the thermometer and the mean temperature of the seasons; as we advance into the interior, the extreme range of temperature increases and the seasons are violently contrasted; having come within the influence of the Great Lakes, a climate like that of the sea-board is found; and proceeding into the region beyond the modifying agency of these inland seas, an excessive climate is again exhibited. Here are then two systems of climate on the same parallels of latitude, that of the ocean and the lakes being characterised as *uniform*, and that of the intervening tract and the region beyond the lakes, as *excessive* climates. As the mean annual temperature presents little variation on the same parallel, the marked difference of climate arises from the unequal distribution of heat among the seasons. In positions remote from large bodies of water, the winters are colder and the summers hotter than in the opposite localities in the same latitude. This is strikingly illustrated by a comparison of the difference between the mean temperature of winter and summer, and the difference between the warmest and coldest month, in the two systems of climate. Let us take, for example, Fort Sullivan, on the coast of Maine, and Fort Snelling in Iowa Territory, the two being nearly in the same latitude. At the former, the difference in the mean temperature of winter and summer is 39°.15, whilst that of the latter is 56°.60; and between the warmest and coldest months, the ratios are respectively 43°.87 and 61°.86. Accordingly, we find too a considerable difference in the mean annual range of the thermometer, which is at Fort Sullivan 104, and at Fort Snelling 119. But another marked distinguishing feature between these two systems of climate, is, the difference between the mean temperature of winter and spring, which is at the former 17°.16, and at the latter 30°.83—a cause to which is owing the sudden development of vernal vegetation in excessive climates.

In Canada the annual ratio of deaths, according to the War-office Returns, is 20 per 1000.

Fevers.—The results, compared with those of Nova Scotia and New Brunswick, exhibit a remarkable prevalence of fevers in Canada. Whilst several thousand cases of intermittent fever are reported in the latter command, scarcely one indigenous case has ever been known in the former. The same contrast is exhibited in the results given by Upper and Lower Canada, the proportion being as 178 to 26. Moreover, it is necessary to bear in mind that the majority of cases in Lower Canada occurred among soldiers who had laboured under the disease or had acquired a predisposition to it in the upper provinces. We have already referred to the fact that a similar contrast exists between the coast of New England and the lakes.

The Reporter observes that these diseases are said to be comparatively rare wherever the surface is covered with dense forests, even though the ground is wet and marshy. The vicinity of land recently cleared is most subject to them, particularly meadows or open patches of the forest, which, though denuded of trees, have not been brought under cultivation. It would appear, too, that their prevalence is diminishing with the progress of agricultural improvement.

This opinion is corroborated by the experience of the medical staff of the army, as well as that of the civil practitioners in our newly settled regions. From our earliest history, it has been a well known fact that a region partially cultivated is more insalubrious than a wilderness, or a country in the highest state of agricultural improvement, The hunter and the wild borderer suffer less from disease than the actual settler. The diseases of the former, as the surface of the earth, protected from the sun's action by a dense and exuberant vegetation, yields comparatively little noxious effluvia, are mostly of an inflammatory character, resulting from fatigue and exposure; but as soon as the forest begins to fall at the appearance of the permanent settler, who turns up, at the same time, to the action of our intense summer heats, the soil rich in organic remains, the atmosphere becomes infected with terrestrial emanations, which spread on every side disease and death.

Diseases of the Lungs.—As an evidence how little the tendency to consumption is increased either by intensity of cold or sudden atmospherical vicissitudes, the Reporter adduces the ratios per 1000 attacked annually by consumption in Bermuda, Gibraltar, and Canada, the averages being respectively $8\frac{8}{10}$, $6\frac{5}{10}$, and $6\frac{5}{10}$.

> "In the two former climates the thermometer rarely falls to the freezing point, and its fluctuations are comparatively trifling; in the latter the cold is often so intense as to freeze mercury, the variations sometimes exceed 50° in the course of a few hours, and the soldier, in passing from his heated guard-room to his night duties in the open air, is not unfrequently exposed to an immediate change of temperature exceeding 100°." p. 29.

Epidemic Cholera.—The proportion of deaths to admissions was nearly one in three. One of the most extraordinary features of this epidemic is, that the ratio of fatality is nearly alike in all the military commands investigated. In both the years (1832 and 1834) when this epidemic prevailed, the native Indians suffered from it to the same extent as the white population. Although their principal remedy consisted in swallowing large quantities of charcoal mixed with lard, yet almost the same proportion recovered as among the white inhabitants of the towns, who possessed every advantage which the aid of medical science could suggest. Unlike the epidemics of yellow fever described, not a single officer died from cholera, and only four were attacked during the first, and three during the second epidemic. This leads to the inference, observes the Reporter, that, though little can be done to ameliorate the character of the disease when allowed to arrive at an advanced stage, yet that a generous diet, regular habits, and the degree of attention which persons in the higher ranks of life are likely to pay to its premonitory stages, have a powerful effect in diminishing their liability to its influence.

In tracing the rise and progress of this disease, nothing is more remarkable than the regularity with which, *on both occasions*, it advanced along the principal channels by which the tide of emigration and of commerce flowed through the country. Along the St. Lawrence and the lakes, with the single exception of Fort George, it may be said to have travelled with post-like regularity. This singular disease pursued the same steady course along the banks of the Ottowa, another of the principal channels of emigration into Canada, as well as up the Richelieu, and along Lake Champlain through the United States to New York, a route which is also frequently taken by emigrants on their arrival in Quebec.

> "These circumstances, combined with the fact of several persons having died from the disease on their passage from Ireland, in each of the years when it appeared, led to the belief of its having been imported and subsequently communicated by contagion; various precautionary measures were in consequence adopted to prevent its propagation, and strict quarantine regulations were enforced, both as regards the troops and inhabitants; but, though in some instances these were apparently effectual, in others they proved of little avail, and the contagious nature of the disease was subsequently rendered extremely questionable from the circumstance, that neither the physicians nor those in constant attendance on the sick exhibited any peculiar liability to it." p. 32.

The Reporter next passes under review several classes of diseases, which, notwithstanding they rarely prove fatal, are, in every command, a source of considerable inefficiency, such as rheumatic and venereal affections, abscesses and ulcers, wounds and injuries, diseases of the eyes and the skin, punished, &c.

> *Rheumatic Affections.*—"The first and most striking feature in this comparison is, that in a climate of which the temperature in winter is so low, and liable to such alternations as that of North America, the proportion of rheumatic affections should be less than in the United Kingdom. It is even lower than in the Mediterranean or Bermuda, though there the thermometer rarely falls to the freezing point, and the atmospherical vicissitudes are comparatively trifling. Observations recently made by the medical association of Great Britain on the prevalence of rheumatic affections in different counties of this kingdom have given similar results, and established that these diseases sre less under the influence of atmospheric agency than has generally been supposed." p. 34.

4. *Newfoundland.*—This island lies on the northeast side of the Gulf of St. Lawrence, and adjacent to that part of the American continent termed the coast of Labrador. Its extreme length is 420 miles, and extrame breadth 300; but of this extensive territory the greater part is as yet unexplored. The few tracts visited by Europeans have been found hilly, and sometimes even mountainous, varied by extensive plains covered with grass or low stunted bushes, and intersected by numerous rivers and lakes.

The climate of the southern portion of Newfoundland, it is observed by the Reporter, is similar to that of Nova Scotia, except that the summers are colder, of shorter duration, and liable to more sudden vicissitudes, owing to the melting of the icebergs on the coast, which exerts considerable influence on the temperature; the island has also been long noted for the frequent and dense fogs which prevail along its banks, and often continue during a great part of the summer. None of these agencies, however, seem to operate prejudicially on the health of the inhabitants, among whom the mortality is on a lower scale than in any portion of the American continent.

This favourable view of the climate as regards the native inhabitants, is not, however, confirmed by the extent of mortality among the troops. The returns from these troops do not extend farther back than 1825. Among the veterans, the annual mortality, on an average of 12 years, has been upwards of 41 per 1000, whilst that of the artillery, during the same period, has been only 22 per 1000. The high ratio of the former is ascribed in part to their advanced age, but still more to the effects of long-continued habits of intemperance. Among 100 deaths, from 1825 to 1832, 42 are attributed to the direct effects of drunkenness!

In the section on the extent of *invaliding* among troops in British America, it is shown that the proportion discharged amounts to 19 per 1000 annually, being the average of the Mediterranean stations, and nearly the same as among the dragoon guards and dragoons serving in the United Kingdom. The Reporter having further shown that the ratio per 1000 invalided annually for pulmonic affections, is in British America $3\frac{9}{10}$, Gibraltar $3\frac{9}{10}$, Malta 5, and the Ionian Islands $2\frac{8}{10}$, adds—

> "It is thus manifest, that in the mild climate of Malta, one-fifth more are invalided for pulmonic affections than in British America—a sufficient reason, combined with what has previously been stated on the subject, to render extremely questionable the generally received opinions in regard to the influence of temperature in inducing or aggravating these diseases." p. 38.
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> "In the Mediterranean, the proportion of officers attacked by phthisis annually, has been more than twice as high, and by inflammation of the lungs at least a third higher than in Canada." p. 42.

Influence of Age and Length of Residence on Mortality.—In this section it is shown that mortality increases with the advance of age much more rapidly than in the United Kingdom or Mediterranean. So far as regards the Bermudas, this may partly be accounted for by the circumstance that in warm climates the constitution appears to deteriorate rapidly with the advance of age. This will not, however, account for the same feature being manifested, though in a less striking degree, on the continent of North America.

Deductions from the Preceding Report.—In this section, the Reporter inquires whether there exists in the moral or physical condition of the troops in the Mediterranean and American stations, any difference likely to have influenced the results on which the various comparisons in relation to pulmonary diseases have been founded. We deem it wholly unnecessary to follow him in these details, inasmuch as we believe, and as we hope to demonstrate, that the most of his conclusions are founded in error.

> *Rheumatism.* "The caution necessary to be exercised in attributing to certain peculiarities of climate the prevalence of any class of diseases, is so strikingly exhibited by the proportion of rheumatic affections ascertained to have occurred among the troops in different colonies, that the following abstract will best serve to illustrate our observations on this head:—

	Jamaica.	Nova Scotia and New Brunswick.	Bermuda.	Malta.	Ionian Islands.	Gibraltar.	Canada.	Mauritius.	Windward and Leeward Command.	United Kingdom.	Cape of Good Hope.
Admissions from Rheumatic affections annually per 1000 of mean strength.	29	30	33	34	34½	38	40	46	49	50	57

> "Thus we find that in the mild and equable climate of the Mediterranean or the Mauritius, the proportion of rheumatic affections is even greater than in the inclement regions of Nova Scotia and Canada, and that, though some of the provinces of the Cape of Good Hope have occasionally been without rain for several years, these diseases are more frequent in the dry climate of that command, than in the West Indies, where the condition of the atmosphere is as remarkably the reverse; yet have extreme cold and atmospheric vicissitudes, coupled with excess of moisture, been assigned as satisfactory causes for their prevalence." p. 45.

The Reporter next recapitulates evidence to show how inadequate, in many instances, is the supposed influence of emanations from a marshy soil to account for the origin of febrile endemics.

> "In the present Report, we find it established that yellow fever of the most aggravated form has repeatedly made its appearance at Ireland Island in the Bermudas, a rocky barren spot only a few hundred yards in breadth, containing no marsh, and with little or no vegetation except a few cedar trees." p. 45.

In these statistics no distinction is made between remittent and yellow fever; and we will here repeat that we are not, in the present state of our knowledge, justified in averring that the same miasm which produces remittent fever can, in its more concentrated state, excite yellow fever; much less are we warranted in saying that yellow fever is of paludal origin.

> "All the evidence obtained seems only to warrant the inference that a morbific agency of some kind is occasionally present in the atmosphere, which, under certain circumstances, gives rise to fevers of the remittent and intermittent type; and that, though the vicinity of marshy and swampy ground appears to favour the development of that agency, it does not necessarily prevail in such localities, nor are they by any means essential either to its existence or operation." p. 45.

As the development of the agency producing these fevers requires no doubt a certain concurrence of causes, as heat and moisture, it certainly does not follow that it should "necessarily prevail in such localities;" and, in regard to the question whether a marshy locality is "by any means essential either to its existence or operation," we are decidedly of opinion that the induction which lays intermittent fever to its operation is too strong to be shaken by the exceptions adduced by the Reporter. Such logical refinements will not bear the test of common sense. Were one to attempt to persuade a pioneer of civilization or even a red-skinned Aboriginal, in Florida, Louisiana, or Arkansas, whose experience has taught him that along the margins of streams, lakes, and marshes, he is very subject to intermittent fever, whilst in the adjacent sandy pine woods he is exempt, that there is no connection between the marsh and the fever, he might admire the ingenuity of the reasoning, but would not yield assent against the evidence of his own senses.

Having completed the examination of these documentary reports with the exception of the details in reference to pulmonary diseases, we shall now condense into a tabular abstract the ratios of this class of diseases in each military command, as the West Indies, the United Kingdom, the Mediterranean, and British America. These results are based upon the aggregate mean strength and aggregate of cases and deaths in each command—a method which presents the only legitimate mode of calculation.

Ratio of Pulmonary Diseases.

		Military Commands.	No. of y'rs of Observation.	Aggregate mean Strength.	Ratio per 1000 of the strength annually.							
					Catarrh, Acute and Chronic.		Pneumonia and Pleuritis.		Hæmoptysis and Phthisis Pulmonalis.		All Diseases of the Lungs.	
					Treated	Died	Treated	Died	Treated	Died	Treated	Died
West Indies.	White Troops.	Windward and Leeward Command.	20	86,661	75	2	23	1.3	15	7.1	115	10.5
		Jamaica "	20	51,567	54	.1	14	.3	15	6.2	84	7.5
		Bahamas "	20	535	13		6	4	8	2	23	5.6
		Honduras "	20	320	28		6	3	6		41	3.1
		Average.		139,023	67	1.6	19	.9	15	6.8	103	9.3
	Black troops.	Windward and Leeward Command.	20	40,934	37	2.6	45	3.9	15	9.8	99	16.5
		Jamaica "	20	5,729	12	.5	12	1.3	11	7.5	35	10.3
		Bahamas "	20	7,102	48	.3	25	2.1	9	7	88	9.7
		Honduras "	20	4,356	54	.2	10	.7	12	7	95	8
		Average.		58,121	38	1.9	36	3.3	14	9	91	14.4
United Kingdom.		Dragoon Guards and Dragoons.	7	44,611	122	1.2	16	.8	8	5.6	149	7.7
		Foot Guards.	7	34,538		.2		2.1		11.5		14.1
		Household Cavalry.	7	8,649				.6		7.4		8.1
		West India Depots.	7	23,537		.4		.5		8.7		9.6
		Average.		111,335		.7		1.2		8.2		10.1
Mediterranean.		Gibraltar.	19	60,269	86	.6	42	.9	10	3.6	141	5.3
		Ionian Islands.	20	70,293	48	.4	32	1.2	7	2.9	90	4.6
		Malta.	20	40,826	74	1.1	34	1.1	8	3.7	120	6
		Average.		171,388	68	.6	36	1.1	8	3.4	112	5.2
		Civil population of Malta.	13	1,303,517		.8		.5		1.1		3
British America.		The Bermudas.	20	11,721	77	1.5	38	1.1	11	6.1	126	8.7
		Nova Scotia & New Brunswick.	20	46,442	74	.6	34	1.2	9	4.8	117	6.8
		Upper and Lower Canada.	20	64,280	89	.6	43	1.5	8	4.3	141	6.4
		Average.		122,443	82	.7	39	1.4	9	4.5	131	6.3

Having thus presented a tabular summary of all the results relative to pulmonary diseases, we will be the better enabled to view the subject in its various relations. Before proceeding, however, to test the legitimacy of the inferences deduced, as well as the correctness of the numerical results themselves, it will be necessary, as a preliminary step, to free the question from several difficulties.

The Reporter has assumed England as the *standard of comparison*, by which to test the relative salubrity of other countries in regard to pulmonary diseases. He has consequently adopted a classification of climates based on mere latitude, without reference to the phenomena of temperature arising from physical geography. In the present instance, the impropriety of arranging climates by the test of latitudes is the more apparent from the circumstance that pulmonary diseases, as a class, are peculiarly dependent on climatic characteristics. If then it can be shown that the causes which induce a low ratio of pulmonary affections are little influenced by latitude, will not this standard prove to be a false one? Now, it has been demonstrated by the statistics of the United States Army that in the climates in which the extremes of temperature are moderated, in which there is little difference between the mean temperature of winter and summer—that pulmonary diseases as a class exhibit a low ratio. So great is the influence of local causes upon temperature that at Edinburgh, Scotland, the difference in the mean temperature of winter and summer is only 17°.90, whilst on the same parallel at Moscow, Russia, it is 56°.32; and in North America, on a parallel 12° farther south, we find this difference between the two seasons to be, at Fort Sullivan on the Atlantic sea-coast, 39°.15, at Fort Snelling in the interior remote from any large body of water 56°.60, and at Fort Vancouver, about 1° farther north, on the western coast of America, 70 miles from the Pacific, only 23°.67. As the range of the thermometer is not greater in England than in Italy, and as the difference in the mean temperature of summer and winter is actually less, a classification of climates based on mere latitude in reference to pulmonary diseases, becomes an actual absurdity; but, as in the British commands investigated, the Reporter had to deal entirely with regions characterized by a mild insular climate, or those in which a low temperature predominates, he had not the means of arriving at truth, presented in the systems of climate pertaining to the United States. We are further told in connection with this subject, that a comparison of the ratio annually attacked out of a given number in different countries, presents the most accurate method of determining the relative agency of climate in the causation of particular diseases, more especially if these investigations extend over a long series of years, and include large masses of individuals of the same profession, the same age, the same habits, and the same diet. Now, if the comparisons, unlike the various British commands, were instituted among the natives of each region, the truth of the remark would be more evident.

Keeping these facts in view, we will be at no loss to reconcile many of the apparent incongruities in regard to the laws of pulmonary diseases inferred by the Reporter of the British statistics. The conclusion that pulmonary diseases as regards the *annual* ratio, are more prevalent in certain *systems* of climate in southern than northern latitudes, is confirmed by the statistics of the United States Army; but when we come to consider the relative influence of the *seasons*, the fallacy of the opinion that it is "*by no means likely that any beneficial influence can be exerted by climate itself*" in pulmonic lesions, becomes at once apparent. That catarrhal diseases, for example, are much under the influence of season and climate, is proved by the following statistical results:—Taking the average of the United States, the ratio of winter is two and a half times higher than that of summer, and the ratio of the class of posts in our northern regions, remote from large bodies of water is nearly four times as high as in the peninsula of East Florida. In the former class is Fort Snelling, whose difference in the mean temperature of summer and winter is 56°.60, and in the latter is Key West with a difference of only 11°.34. Even on the same parallels we find the most marked contrasts. Thus on the coast of New England, where the extremes of temperature are modified, the ratio of catarrhal affections is comparatively low; on the lakes, characterized by similar climatic features, the ratio is somewhat higher; whilst in the excessive climate, in the same latitude, in positions remote from the ocean or the lakes, it is more than twice as high. The connection of these facts with *chronic bronchitis* invests them with more than ordinary importance; for it is in that form of consumption which depends on chronic bronchial inflammation that we are justified in the expectation of deriving advantage from change of climate. Even admitting with the Reporter of the British statistics that the ratio of pulmonary diseases is as high in southern as in northern latitudes, it does not militate against the doctrine that benefit will be derived from change of climate in the way of a *winter* residence; for in northern climes, one great object of the pulmonic invalid is to avoid the abrupt transition of the seasons from summer to winter. On the coast of New England, for instance, the ratio of catarrh per 1000 is in the third quarter 36, and in the fourth 85; and consequently the respiratory organs even when normal, are peculiarly susceptible, at this period, to morbid action; but if the pulmonic, at the approach of winter, seeks the climate of East Florida, he will find there, in the fourth quarter, a ratio even lower than that of the third quarter on the coast of New England.

Did space permit, it might be interesting to carry out these views in relation to pneumonia, pleuritis, and phthisis pulmonalis, as elucidated by the statistics of the United States Army. In reference to the last, it will suffice to say that its ratio seems to have no direct relation with the other diseases of this class; for, although much under the influence of season and climate, yet it is still more under the control of other agents. Chronic bronchitis, it is very probable, acknowledges the general law, whilst the deviation is caused by cases of a tubercular nature.

Another important law developed by the statistics of the United States troops is, that, in those climates in which a high or a low temperature predominates, the ratio of pulmonary diseases is lower than in the intervening region characterized by the extremes of both. In regard to pleuritis, pneumonia, and phthisis pulmonalis, it is found to be so in every respect; and, so far as catarrhal diseases are concerned, the law holds good on the coast, Florida and New England having lower ratios than the middle coast. In Europe it has also been ascertained that phthisis pulmonalis prevails less in Sweden and along the Mediterranean countries than in the intervening regions.

With these remarks, we are prepared to consider more in detail the results and deductions of the Reporter, as expressed in the several quotations made during the progress of this review. To enable the reader to do the Reporter the fullest justice in regard to the comparisons instituted between England and the West Indies, we would ask him to re-examine the extracts on pages 434, 439, 440–1, 445, and 446, as well as the tabular abstract on page 466. In addition to the objections already made to England as a standard of comparison, we have now to add that the ratios of that command which gives the *lowest* results are taken as the comparative tests, by which all the deductions in reference to pulmonary diseases become still further vitiated. A glance at the table will show that the ratio of mortality from the class of pulmonary diseases in England varies from $7\frac{7}{10}$ to $4\frac{1}{10}$, the former of which is in all cases assumed as the standard. The high ratio of the foot guards, it is true, is set aside as an "exception," because it appears "*attributable to other causes than the climate of the metropolis;*" but, on the other hand, we find that the comparison is made with the *highest* ratio among the white troops in the West Indies, notwithstanding he thinks it "*not attributable to climate only, but also to some peculiarity from which officers are exempt!*" As the mortality among the enlisted men from this class of diseases is four or five times greater than among the officers, the result cannot be wholly ascribed to general causes; and, as the same morbid agents may be in operation in the Windward and Leeward Command as among the foot guards, it is unfair to suppress the one and show forth the other. Reasoning from general principles, it was shown that the ratio of pulmonary diseases ought not to be very much higher in England than in the West Indies; and this relation obtains in reality. Taking the aggregate strength and aggregate mortality from diseases of the lungs of all the white troops in the West Indies, and the same of all the commands in England, the result is in favour of the former. In the United Kingdom, the annual mortality per 1000 of strength is $10\frac{1}{10}$, whilst in the West Indies the ratio is only $3\frac{3}{10}$. Contrary to the deductions of the Reporter, it is also seen that the mortality from hæmoptysis and phthisis pulmonalis, as well as from pleuritis and pneumonia, is lower in the latter. The average of pulmonary cases under treatment is found, likewise, much lower in the West Indies, the annual ratio per 1000 being as 103 to 149, notwithstanding the latter is the ratio of the dragoon guards and dragoons, which give the lowest mortality, it being impracticable to determine from the tables the ratio of cases treated in the other commands.

It is thus seen that by assuming the *highest* average in one command and the *lowest* in another, unwarranted conclusions have been deduced. Were even the mortality from pulmonary diseases in the West Indies higher than in England, it would not be surprising; for here are men from a northern clime exposed, through all seasons, to the influence of a high temperature; and as this mortality arises chiefly from phthisis pulmonalis, which the Reporter maintains to be of tubercular origin, the disease is doubtless often induced by the deterioration which the constitution undergoes, especially in cases of intemperate habits, from repeated attacks of febrile and chronic intestinal affections—an opinion warranted by the statistics of the United States army. This may be regarded as a prolific source of pulmonary consumption among the British troops in the hot climate of the West Indies. An English soldier sent to these islands, enlisted for life, with no hope of escape but in the grave—labouring under the influence of the depressing passions, as is manifest from the extremely high ratio of suicides—reckless in his habits, both moral and physical—and exposed to the unceasing agency of those morbific causes by which the vital energies are gradually exhausted—is peculiarly liable, especially when predisposed, to the development of this disease. This view is corroborated by the fact that officers in the West Indies—a class of men animated by the opposite feelings—enjoy a comparative exemption from this malady, which is a circumstance the more remarkable when it is considered how carefully recruits, more especially as regards the chest, are examined, whilst officers undergo no personal examination.

The prevailing idea in regard to the advantages of acclimatization is disproved by statistical investigations, not only in the West Indies, but all other climates in which British troops are stationed.[*] As no length of residence is of any avail in diminishing the liability to the malignant diseases of the West Indies, it follows that the causes assumed as exercising a powerful agency in the production of phthisis pulmonalis, are uniformly progressive in their fatal tendency. Labouring for years under the most insidious forms of disease, the system becomes less fitted to resist morbific agents than that of him who brings to this climate the full health and vigour of an unimpaired northern constitution. The conclusion of the Reporter that the great susceptibility of troops to consumption in the West Indies, "is not attributable to climate only, but also to some peculiarity in their condition from which officers are exempt," finds, it is believed, an adequate explanation in the operation of the causes here detailed.

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[*] "Noxious agents or causes of mortality," says a late writer, (On the enlisting, discharging, and pensioning of soldiers. By Henry Marshall, F. R. S. E., deputy inspector-general of army hospitals,) "exist in all countries, and these causes of mortality will have greater or less influence upon the human body, in proportion to its conservative powers. The rate of mortality among a body of troops is therefore, in some degree, a test of the existence, and a measure of the power of these destructive agents. It has long been supposed that the conservative powers of the constitution acquired

That the West Indies offer no advantages as a winter residence to the pulmonary invalid, may, at first view, be inferred; but this is more apparent than real, inasmuch as it has been shown that these diseases, as a class, are as much under the influence of the seasons as intermittent fever, and that consequently one great object of the pulmonic invalid in seeking a southern clime as a winter residence, is to avoid the abrupt transition of summer into winter. That tubercular consumption might be hastened to its fatal issue by a continuous residence in these islands is probable, but this objection has no reference to a mere *winter* residence. Notwithstanding the Reporter directs attention to "the baneful influence of the climate of the West Indies in accelerating the progress of consumption," it is found that the annual ratio of mortality from hæmoptysis and phthisis pulmonalis is only $6\frac{8}{10}$ per 1000, exclusive of those sent home as invalids, whilst that of the United Kingdom, is $8\frac{2}{10}$. Now could we institute a comparison between the civil population of England and the native white inhabitants of the West Indies, the comparative results might be deemed correct.

Next in order come the Mediterranean Commands. In *Gibraltar*, notwithstanding the unfavourable views taken of this climate by the Reporter, (see *ante* p. 449,) the annual ratio of mortality from all pulmonary diseases is only $5\frac{3}{10}$ per 1000, which is little more than half the average presented in the United Kingdom. From hæmoptysis and phthisis pulmonalis, the mortality in the former is $3\frac{6}{10}$, and in the latter $8\frac{2}{10}$; but as many of the consumptive patients were invalided the Reporter thinks the ratio for Gibraltar too low. In regard to the correctness of the opinion that inflammation of the lungs is "much more" frequent at Gibraltar than in England, we are unable to judge, as the Reporter in his tabular abstracts of the troops at home, with the exception of the dragoon guards and dragoons, does not give the number treated; but one fact appears from our table, p. 466, viz. that the mortality from this cause is one third less than in England. The average of all pulmonary cases treated at Gibraltar is also lower, even taking that of the dragoon guards and dragoons, the *lowest* ratio, as the standard of comparison.

The island of *Malta*, notwithstanding the Reporter thinks it "by no means favourable to persons predisposed to" pulmonary diseases, (*ante* p. 451

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strength by length of residence in unhealthy climates, but this inference or conjecture derives no confirmation from statistical investigations." In Jamaica, for example, a station in which the strength is usually kept up by young recruits varying from 19 to 21 years of age—the annual ratio of mortality among soldiers between the ages of 18 and 25, is 70 per 1000, between 25 and 33, 107, between 33 and 40, 131, and between 40 and 50, 128 per 1000. This is the case "not only in regard to Jamaica," adds the same writer, "but also in regard to the Windward and Leeward Island station, and uniformly in all the other stations, both in the temperate and torrid zones."

-2,) presents an annual ratio of mortality by this class of 6 per 1000, whilst that of England is $10\frac{1}{10}$. From hæmoptysis and phthisis pulmonalis, the mortality is, $3\frac{7}{10}$, which is not one half as high as in England; but in these comparisons, some allowances must be made for the invaliding of consumptive patients. From pleuritis and pneumonia, the mortality is also higher in England, notwithstanding the Reporter asserts "*that in the mild climate of Malta they are twice as fatal.*" (*Ante* p. 455-6.)

The Reporter next inquires into the extent of pulmonary diseases among the civil population of Malta—an investigation which leads him to the following conclusion:—" Nor is the fatal influence of diseases of the lungs confined to the troops alone; it extends in a *corresponding degree* to the inhabitants." As this deduction is wholly unwarranted, it again becomes our duty to expose the fallacy of his reasoning. The average population is 100,270, and the tabular abstract extends over a period of 13 years. From diseases of the lungs, the aggregate of deaths is 6664, among which are reported 1363 of phthisis pulmonalis, and 2786 of consumption. The ratio of deaths from this class of diseases among all ages, is, therefore, about $5\frac{1}{8}$ per 1000 of the population. This ratio then, according to the Reporter's own calculation, is only half as high as in England; but it will be observed that deaths are reported by the Maltese medical practitioners under the different heads of consumption and phthisis pulmonalis. "The former," the Reporter says, "is understood principally to refer to that class of consumptive cases more generally designated as *marasmus*, which term has been adopted in the returns since 1831. * * * They are understood to have occurred *principally among children and old persons*, and many of them may not have been directly attributable to diseases of the lungs, though, as we possess no means of distinguishing the *exceptions*, it has become necessary to include them under that class." The *exceptions*, in this case, evidently constitute the rule. In his anxiety to establish his favourite views, the Reporter is not content to include under the class of diseases of the lungs the cases of marasmus reported as consumption prior to 1831, but he also takes those *reported as marasmus* subsequently to that period. Hence it is no ways surprising that Sir Andrew Halliday, Inspector-General of Hospitals, deplores the strange fact that the duty of collating these statistics should have been "delegated to a captain in the army destitute of professional knowledge." Although we are free to concede that Major Tulloch has performed his task with great ability, always excepting those deductions which involve medical opinions, yet we are not the less convinced that the old adage—" ne sutor ultra crepidam"—is a good one.

But to return. Excluding, therefore, the 2786 fatal cases of marasmus, or consumption, which "*occurred principally among children and old persons*," the ratio of mortality from hæmoptysis and phthisis pulmonalis is reduced to $1\frac{1}{10}$, (about one-eighth of the average in England,) and that from all diseases of the lungs, to 3 per 1000. The fatality of pleuritis and pneumonia is not half as great as among the troops. It is thus seen that the mortality from all diseases of the lungs among the civil population, contrary to the deduction of the Reporter, that it is in a "corresponding degree," is not half as high as among the troops, and not one-third as great as the average of the several commands in the United Kingdom. But as truth, it is said, never lies in extremes, so it may be well to take the ratio of hæmoptysis and phthisis pulmonalis, including *one-half* of the cases of marasmus. By this computation, the ratio is $2\frac{2}{10}$, which is much lower than among the military, and only one-fourth of the average in England. These results find corroboration in the fact that among the "Malta Fencibles"—a corps composed entirely of natives, the annual ratio of mortality from all causes is only 9 per 1000, being less than half as high as that of the foreign troops.

The Ionian Islands.—This group, remarkable for tempestuous weather and sudden and frequent alternations of temperature, gives a lower ratio than Malta or Gibraltar, (*ante* p. 454.) The mortality from all diseases of the lungs is $4\frac{6}{10}$ per 1000, and including the invalids sent to Malta, $4\frac{8}{10}$—a mean not half as high as that of the United Kingdom. The ratio of cases treated is also much higher in England, aye, even in the dragoon guards and dragoons, being as 149 to 90. These results, considering the contrast in the climate of Malta and the Ionian islands, seem to corroborate the laws established by the statistics of the United States army, so far as regards mere variableness of temperature.

This view of the results of the several Mediterranean commands leads to conclusions diametrically adverse to those deduced by the Reporter, as exhibited in the quotations on pages 455–6. We are wholly at a loss to perceive "the interesting fact that, except the Ionian Islands, the liability of troops to consumption in the Mediterranean stations is even greater than in the United Kingdom," or that, if due allowance be made, "the proportion of deaths also, among those attacked by consumption, will be found fully as high." On the contrary, we find, (see table, p. 466,) that excluding those invalided, of which the mortality is unknown, the ratio of deaths from hæmoptysis and phthisis pulmonalis, in the Mediterranean stations per 1000, is $3\frac{4}{10}$, and the mortality from all the diseases of the lungs, $5\frac{2}{10}$; whilst in England, the former is $8\frac{2}{10}$, and the latter $10\frac{1}{10}$. But as the ratio invalided is not more than 4 per 1000 annually, it follows that if all died, still the average is lower in the Mediterranean. We are consequently wholly unable to discover the "striking contradiction to the popular idea," more especially when we call to mind the fact that these ratios are exceedingly low among the Maltese natives. "That inflammatory affections of the lungs are nearly twice as prevalent" in the Mediterranean as in England, and that in the "mild climate of Malta they are also twice as fatal," is a deduction that we have completely disproved; and in respect to the civil population of Malta, we have in truth more than reversed the position. Instead, therefore, of its "being by no means likely that any beneficial influence can be exerted by the climate itself" in pulmonary diseases, it is satisfactorily shown that it is even advantageous as a continuous residence. To the pulmonic invalid from the excessive climates of the middle regions of Europe, who seeks this region merely as a winter residence, the beneficial results must consequently be incalculable. Admitting even the correctness of the Reporter's results, they would not militate against the laws established in relation to the relative influence of the seasons.

The last command investigated is British America. In the *Bermudas*, lying about 600 miles east of South Carolina, the annual ratio of mortality from diseases of the lungs is $7\frac{8}{10}$ per 1000. This average, though higher than in the Mediterranean stations, is lower than in England. Notwithstanding the uniformity of temperature which obtains in this group of islands, the summers are exceedingly hot, even more so than in the West Indies.

In Nova Scotia and New Brunswick, as well as Upper and Lower Canada, the ratio of admissions and deaths from diseases of the lungs is considerably lower than in the United Kingdom, (*ante* p. 459, 462, and 464.) As this is a region in which a low temperature prevails, the result is no ways surprising; for notwithstanding in Canada, "the variation sometimes exceeds 50° in the course of a few hours," the law that pulmonary diseases are less prevalent in those regions in which a high or a low temperature predominates than in the intervening region characterized by the extremes of both, has been abundantly established in the systems of climate pertaining to the United States. In the harmony of these results, we perceive the order which reigns throughout nature; and these laws find confirmation in Europe, inasmuch as the returns of Sweden do not exhibit a higher ratio of pulmonary diseases than the climate of the Mediterranean. It has also been shown by statistical facts, by M. Andral, that phthisis pulmonalis is more prevalent in the middle regions of Europe than at either extreme.

The more recent statistical reports of Major Tulloch "On the sickness, mortality, and invaliding among the troops in Western Africa, St. Helena, the Cape of Good Hope, and the Mauritius," will not now be noticed; but we may add that the results in regard to pulmonary diseases afford no evidence corroborative of the Reporter's favourite views. As all these commands belong to the class of mild or uniform climates, the results are much in favour of southern latitudes; for whilst in England, the annual mortality from all diseases of the lungs per 1000 is $10\frac{1}{10}$, among the troops on the western coast of Africa, it is $4\frac{9}{10}$, in St. Helena $3\frac{2}{10}$, and at the Cape of Good Hope $3\frac{9}{10}$. At the Mauritius, the average is nearly twice as high as at the Cape of Good Hope; but as the ratio of pulmonary cases treated in the two commands is nearly the same, the great source of mortality in the former arising from consumption, we have another evidence of the fact that the ratio of phthisis pulmonalis in general and the other diseases of the lungs have no apparent relation. We are also told that "among 71,850 native troops serving in the Madras Presidency, the deaths by every description of disease of the lungs did not, on the average of five years, exceed *one per thousand* of the strength annually." This ratio, which is only one-tenth as high as in Great Britain, may be considered, unlike that of the island of Malta, a fair standard of mortality from pulmonary diseases among native troops.

It is thus seen that the conclusion of the Reporter, that the class of pulmonary diseases is more prevalent and fatal in southern than northern latitudes, is the result of hasty generalization, or rather that it has arisen from a classification of climates on mere latitude without reference to the phenomena of temperature induced by local causes. Although the Reporter has, in some measure, set the world right in regard to a *theoretical* error, he has unfortunately, at the same time, led it into a *practical* one. His first error was assuming the climate of England as the standard of comparison—the second, comparing the *lowest* average in one command with the *highest* in another—and the third, basing his deductions on the *annual* results without reference to the relative influence of the *seasons*. We have devoted the more attention to this subject in consideration of its importance to the pulmonary invalid, and from the conviction that the evil influence of false doctrines bears a direct ratio to the character of the authority whence it emanates.

S. F.